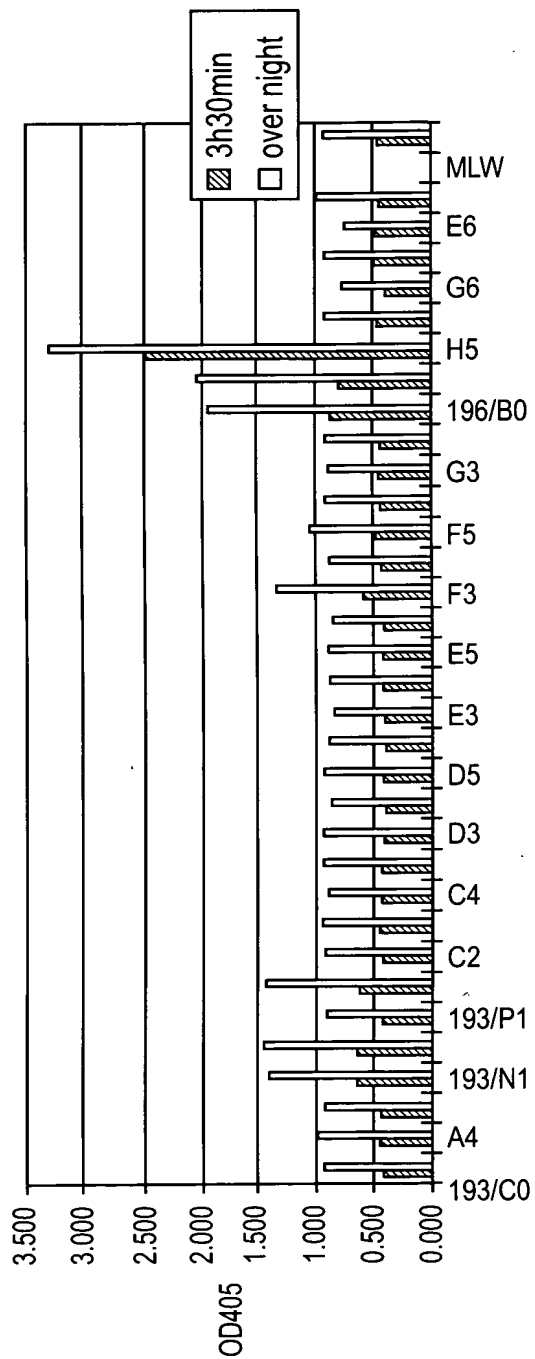




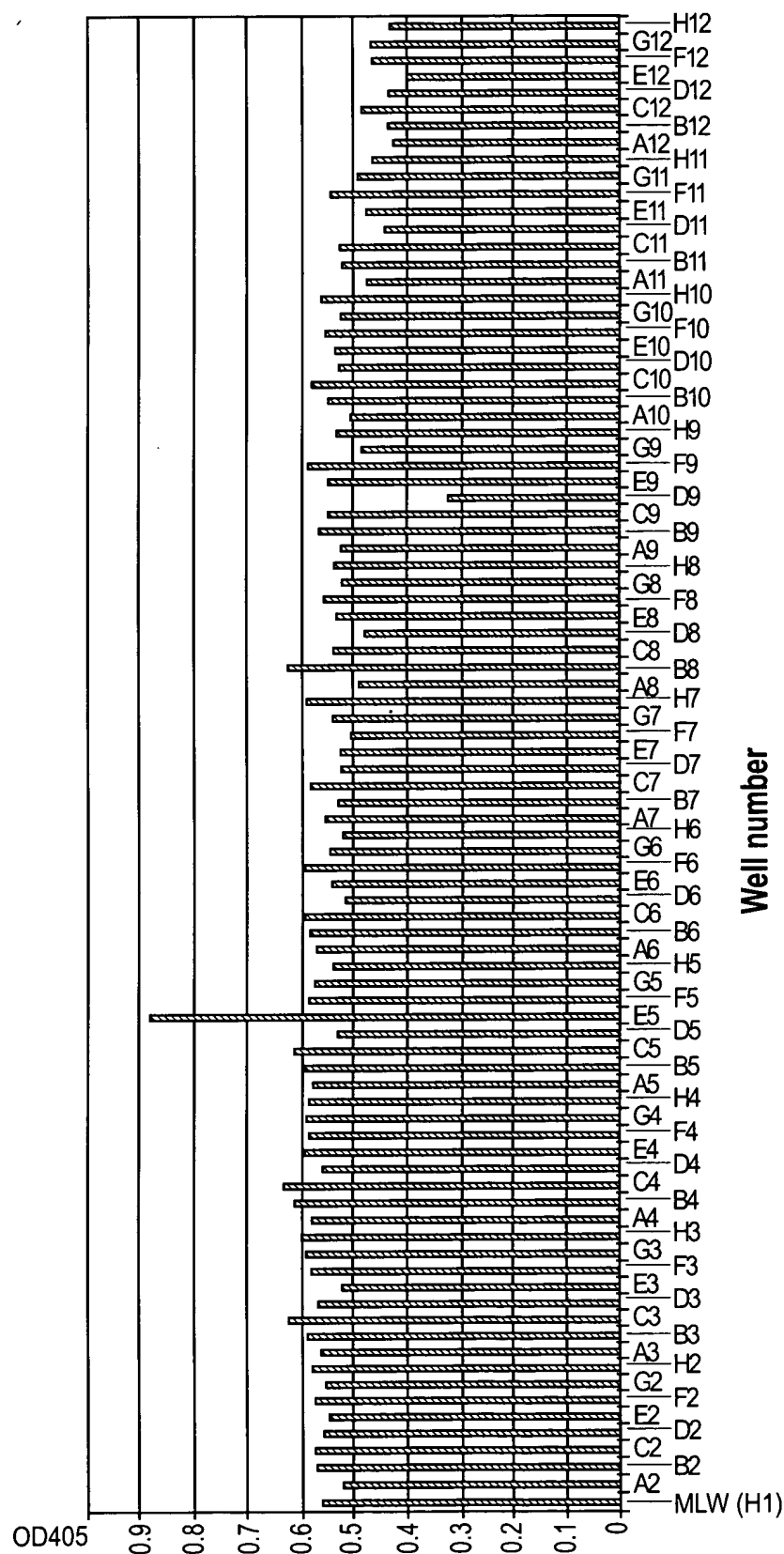
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clone #

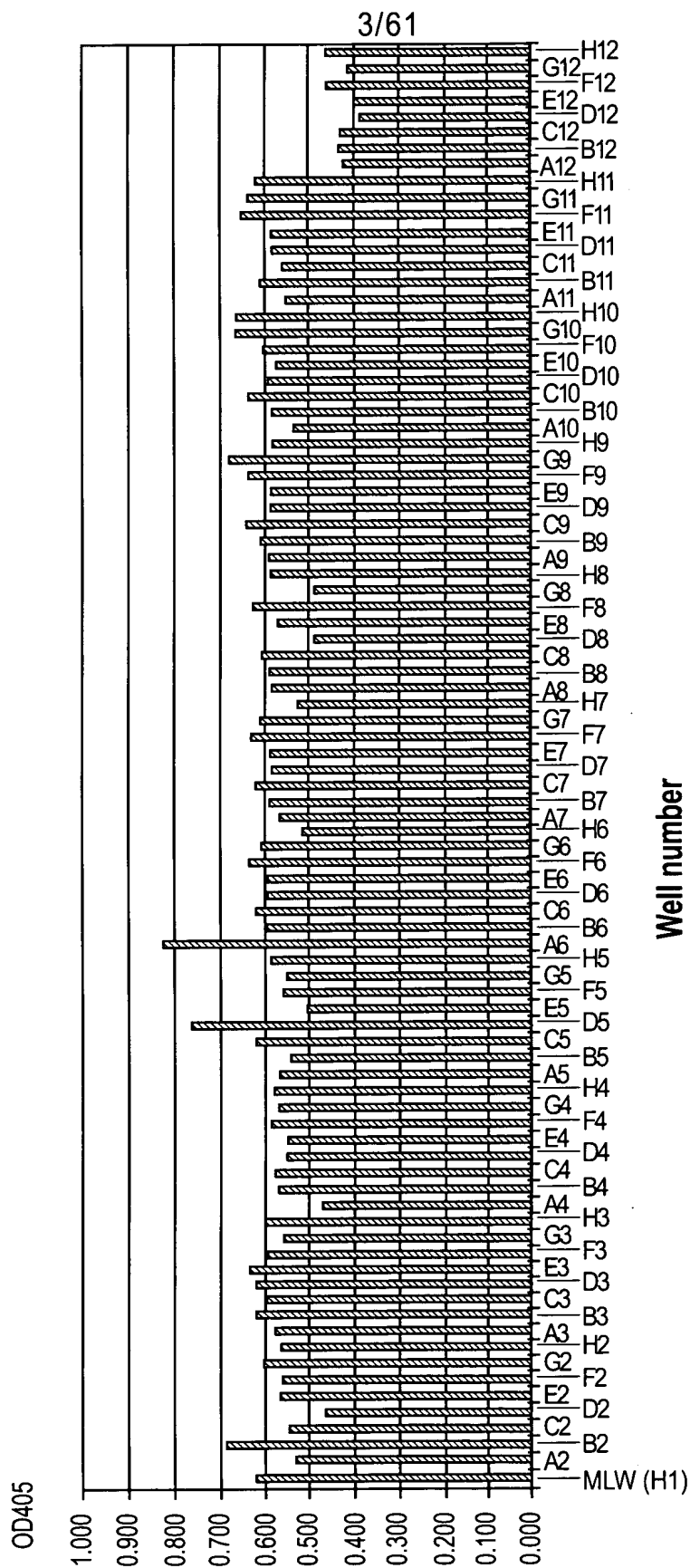
**FIG. 1**

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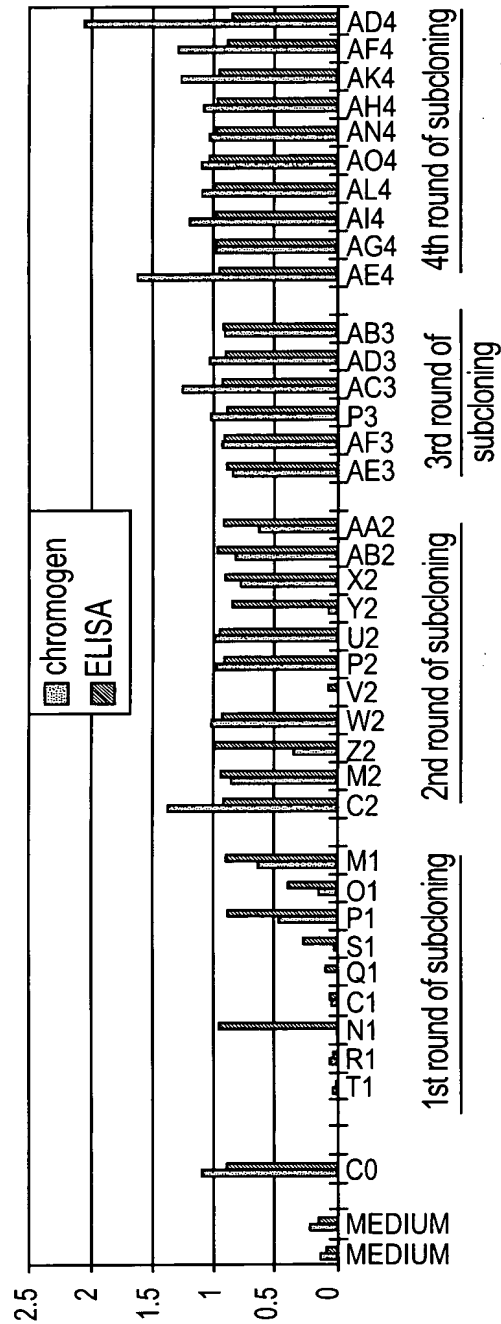


Well number

FIG. 2

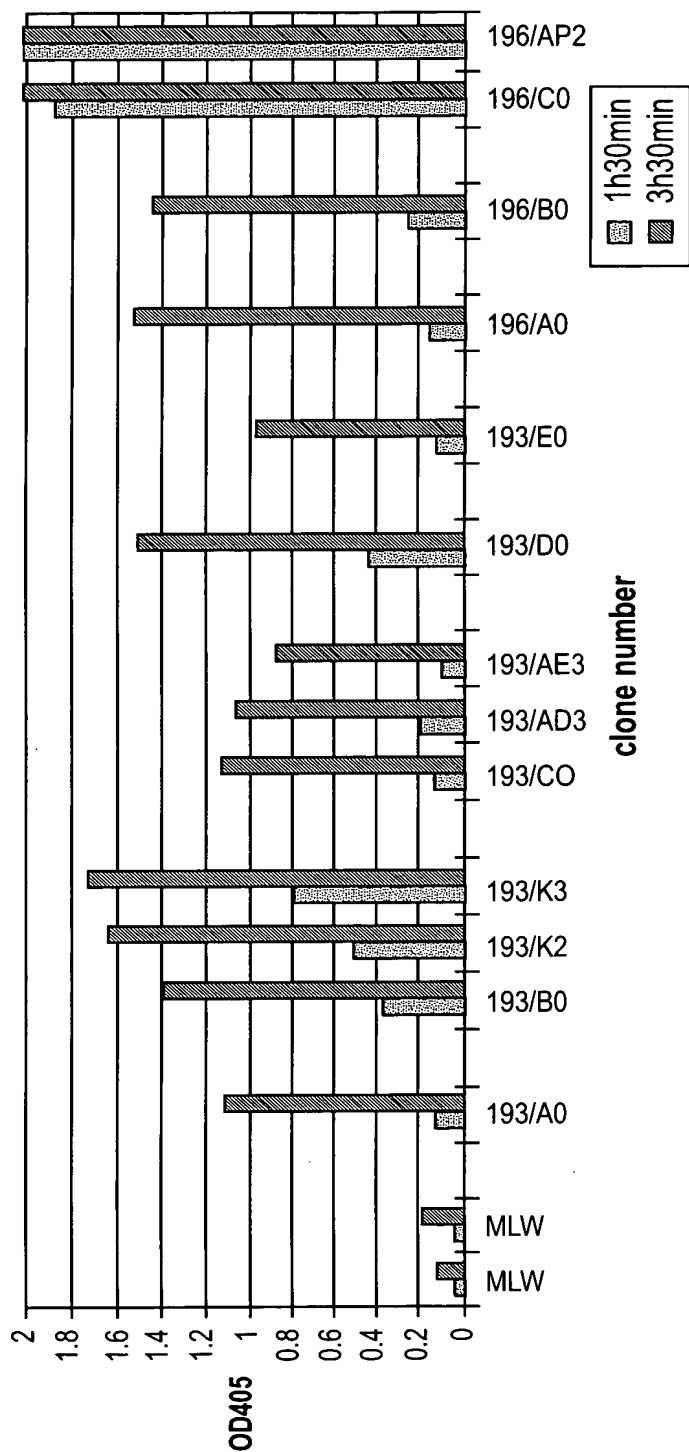


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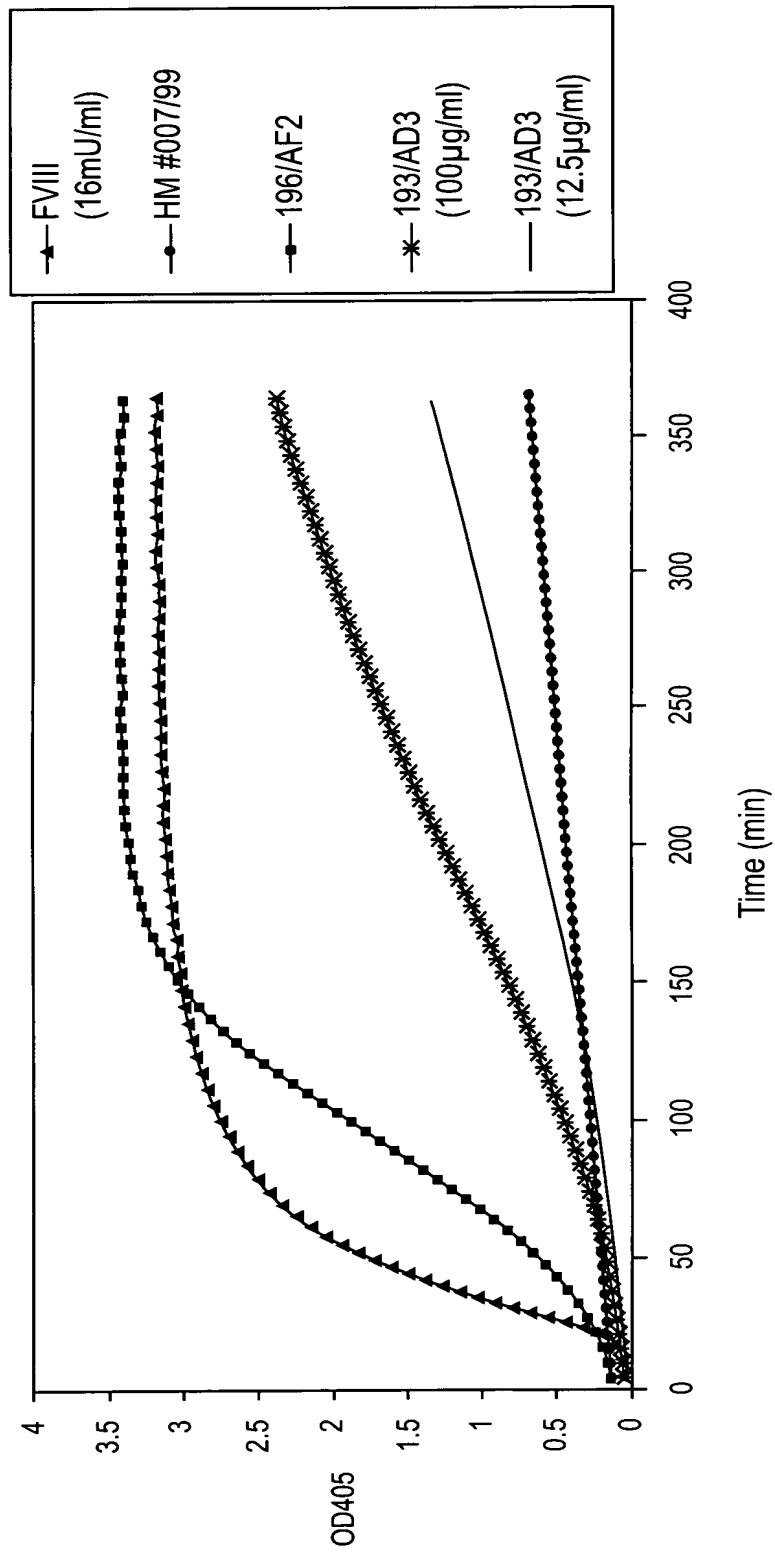
**FIG. 4**

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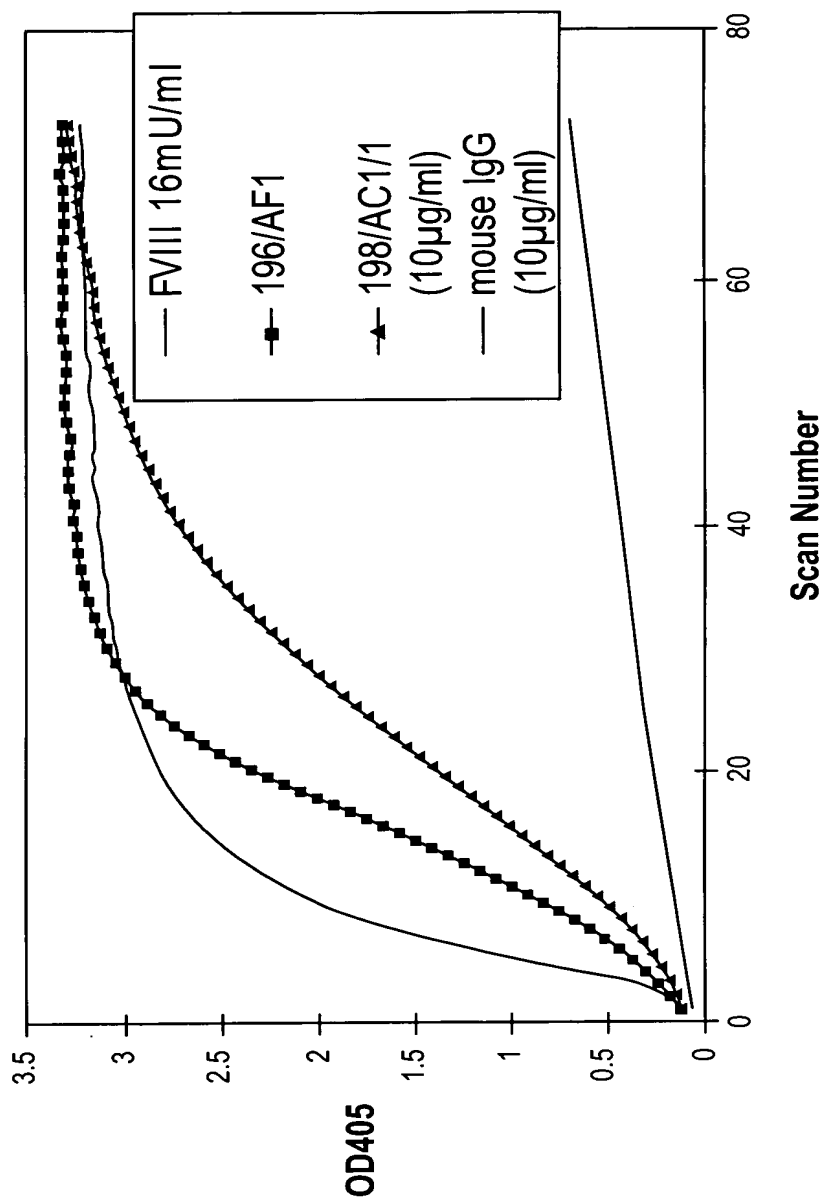
**FIG. 5**

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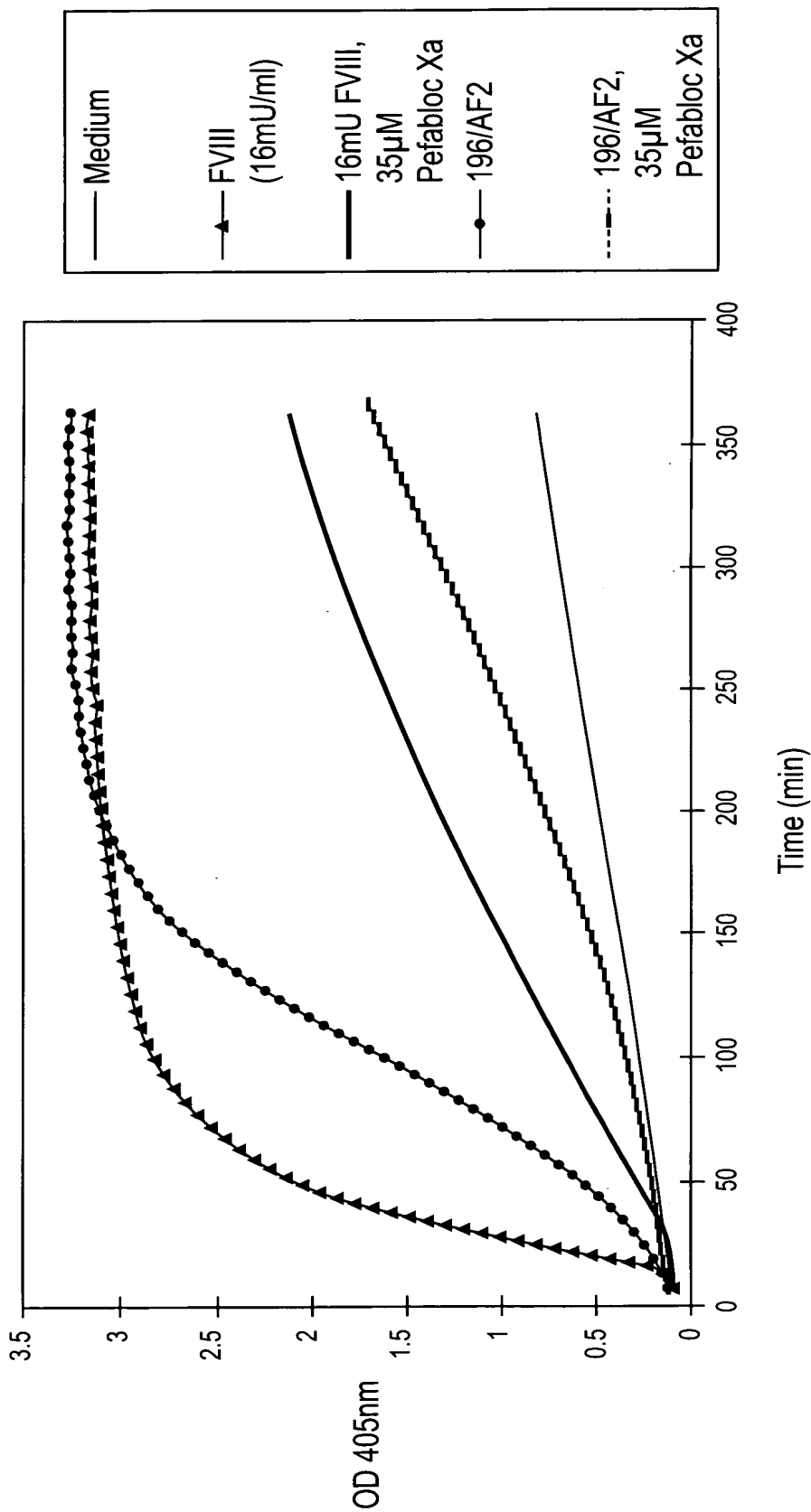
**FIG. 6A**

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**FIG. 6B**

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**FIG. 7A**



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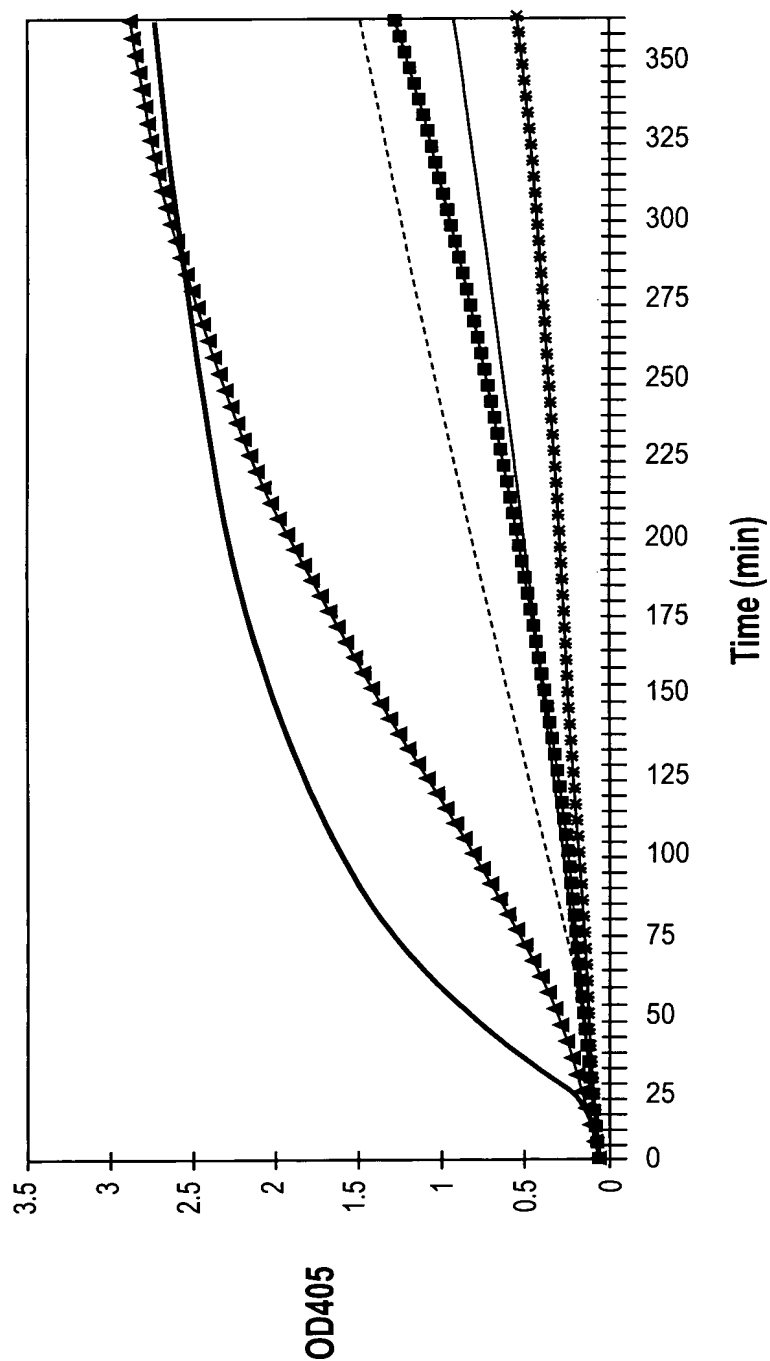
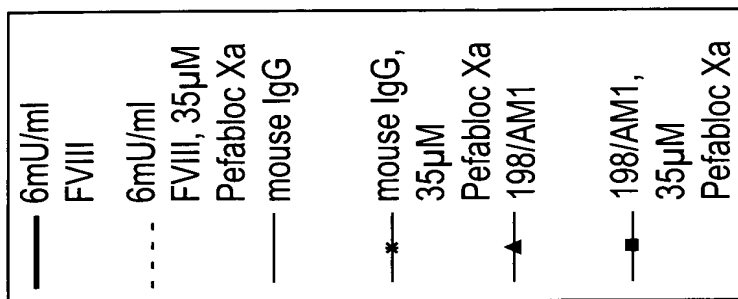
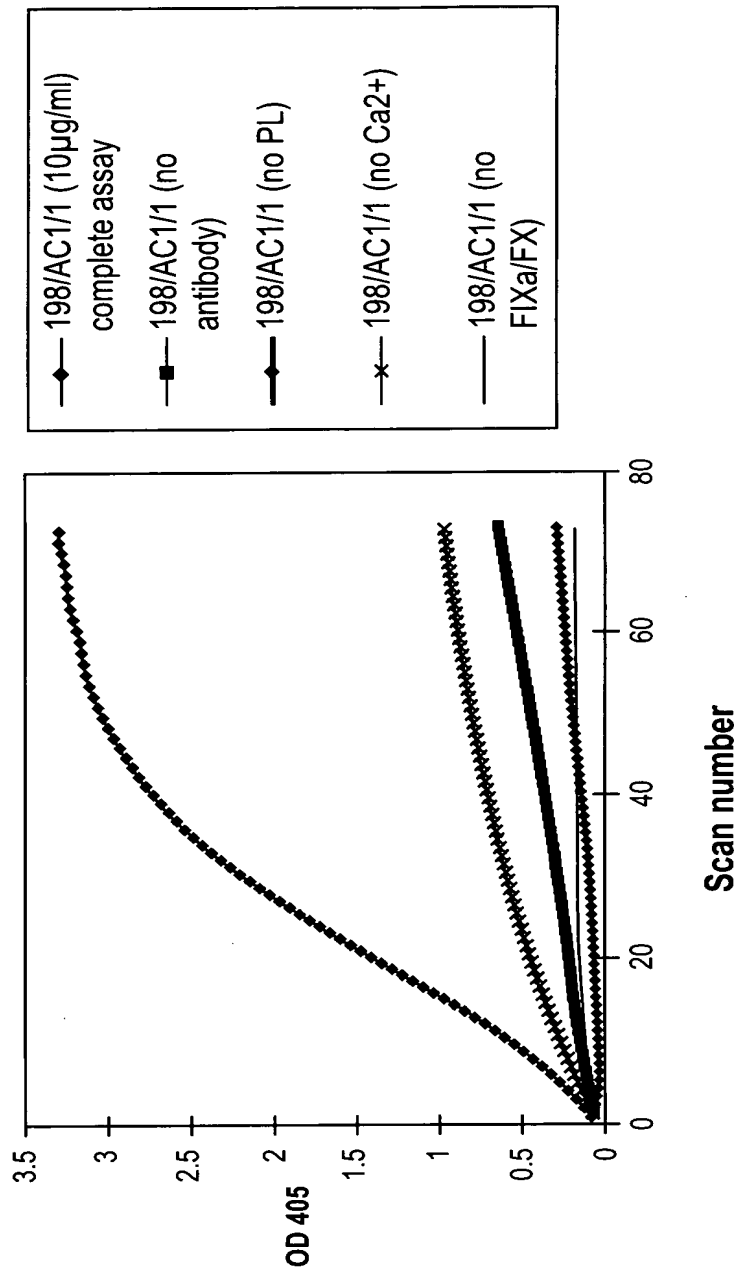


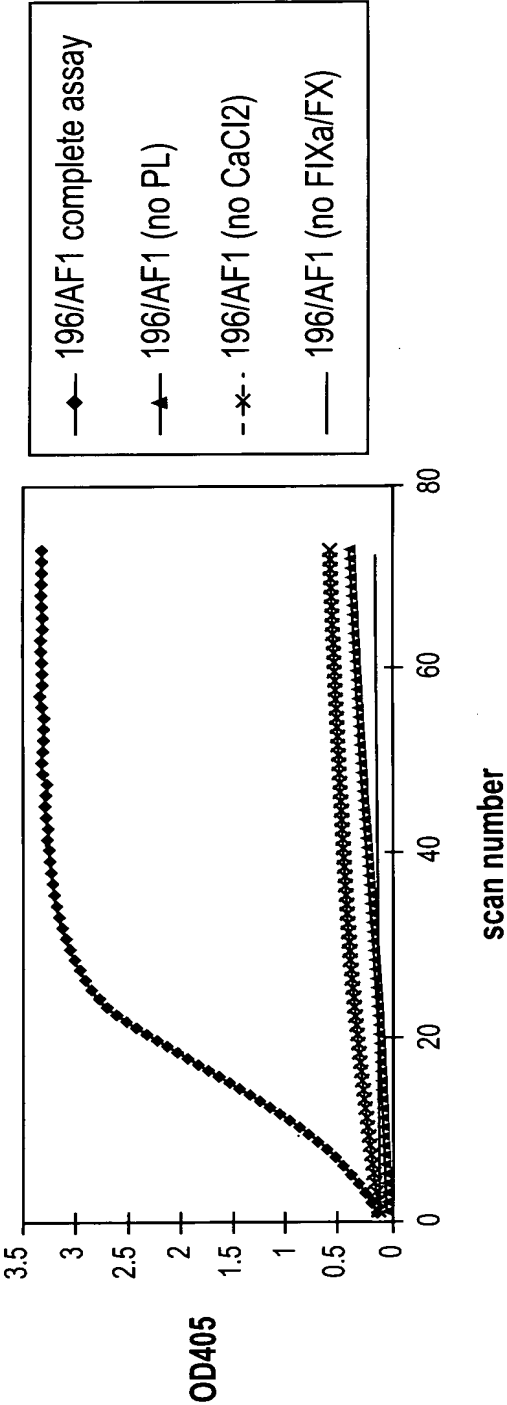
FIG. 7B

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**FIG. 8A**

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**FIG. 8B**

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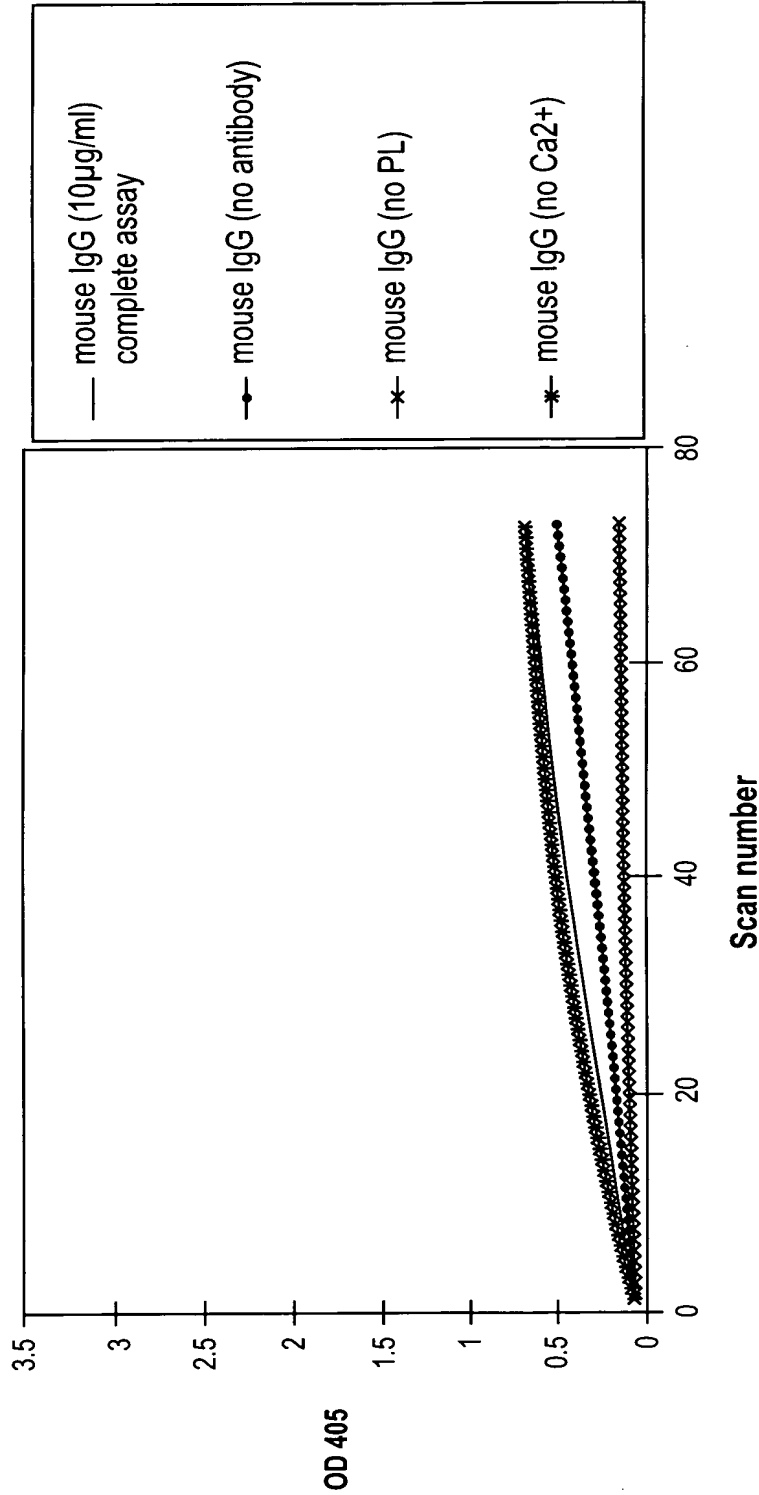
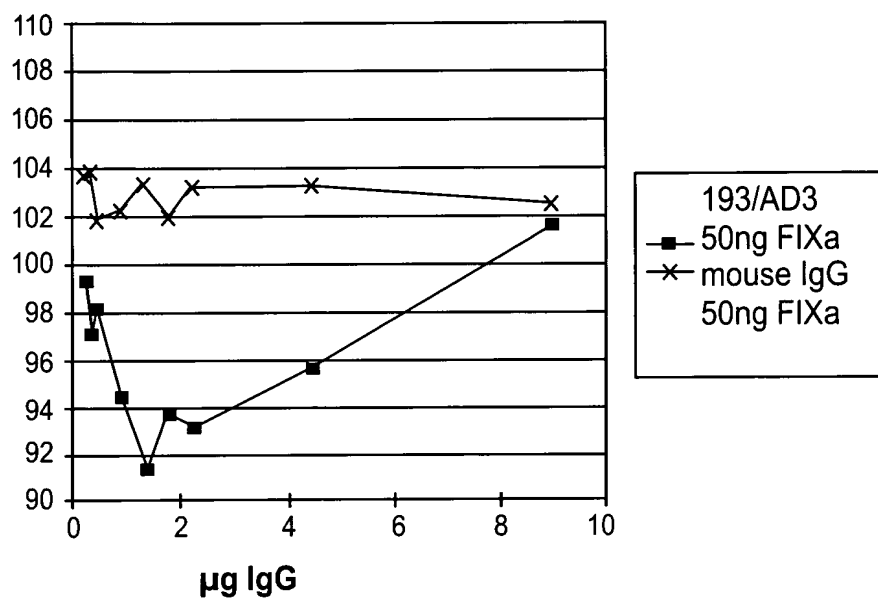


FIG. 8C

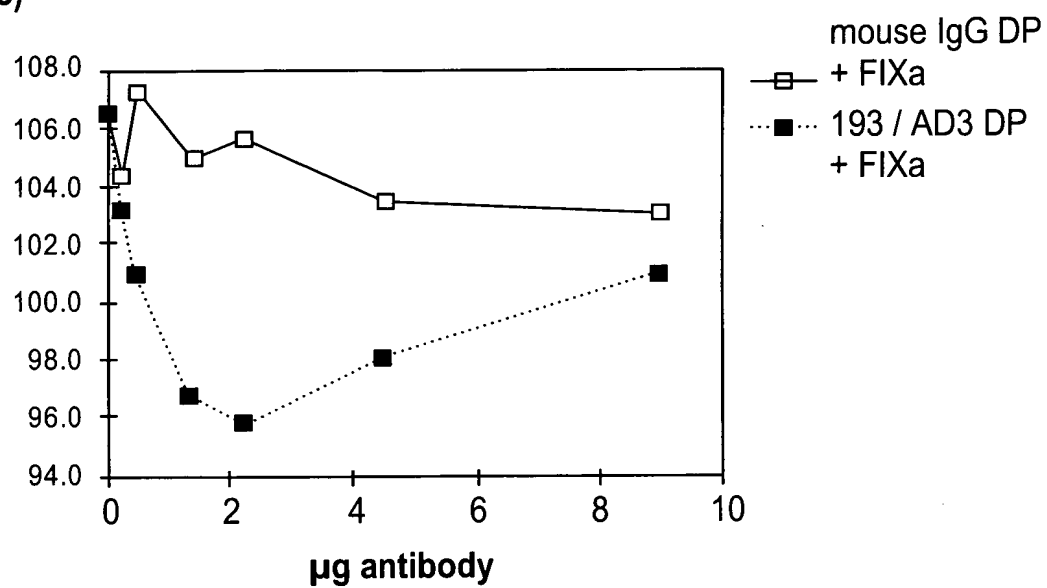
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**FIG. 9**

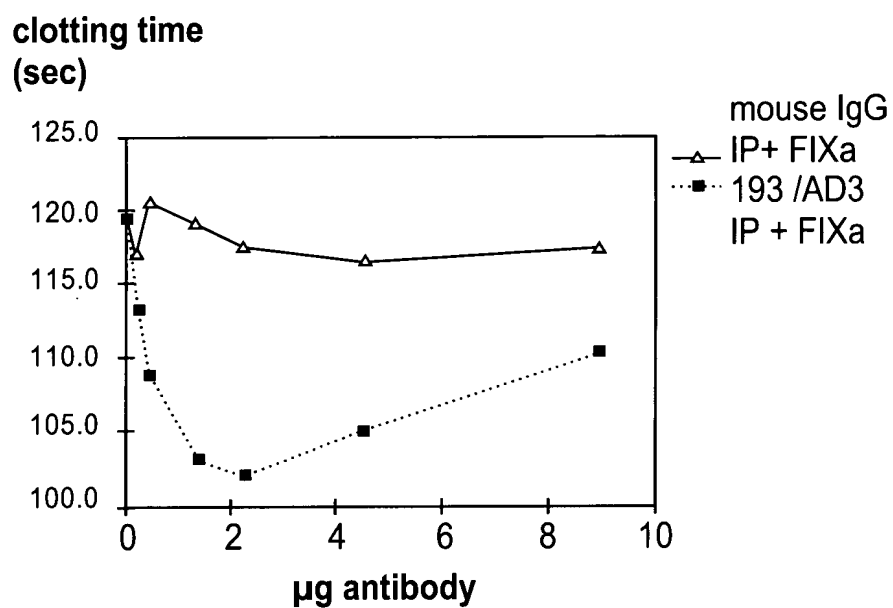
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clotting time  
(sec)



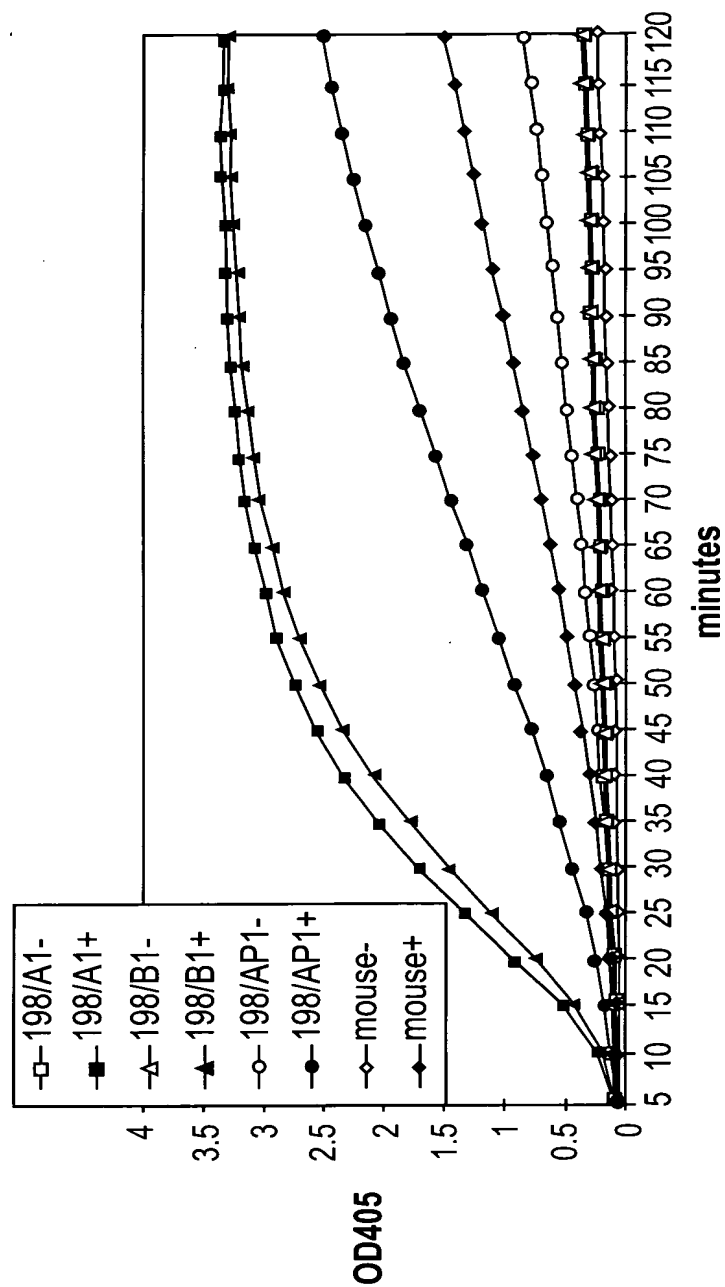
**FIG. 10A**

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**FIG. 10B**

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**FIG. 11**



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Mouse V<sub>H</sub> back primers (containing SfiI-site):

|              |   |
|--------------|---|
| VH1BACK-SfiI | 5' C ATG CCA TGA CTC GCG GCC CAG CCG GCC ATG GCC SAG GTS MAR CTG CAG<br>SAG TCW GG 3' (SEQ.ID.NO. 50) |
| VH1BACKSfi   | 5' GTC CTC GCA ACT GCG GCC CAG CCG GCC ATG GCC GAG GTG CAG CTT CAG GAG TCA<br>GG 3' (SEQ.ID.NO. 51)   |
| VH2BACKSfi   | 5' GTC CTC GCA ACT GCG GCC CAG CCG GCC ATG GCC GAT GTG CAG CTT CAG GAG TCR<br>GG 3' (SEQ.ID.NO. 52)   |
| VH3BACKSfi   | 5' GTC CTC GCA ACT GCG GCC CAG CCG GCC ATG GCC CAG GTG CAG CTG AAG SAG TCA<br>GG 3' (SEQ.ID.NO. 53)   |
| VH4/6BACKSfi | 5' GTC CTC GCA ACT GCG GCC CAG CCG GCC ATG GCC GAG GTY CAG CTG CAR CAR TCT<br>GG 3' (SEQ.ID.NO. 54)   |
| VH5/9BACKSfi | 5' GTC CTC GCA ACT GCG GCC CAG CCG GCC ATG GCC CAG GTY CAR CTG CAG CAG YCT<br>GG 3' (SEQ.ID.NO. 55)   |
| VH7BACKSfi   | 5' GTC CTC GCA ACT GCG GCC CAG CCG GCC ATG GCC GAR GTG AAG CTG GTG GAR TCT<br>GG 3' (SEQ.ID.NO. 56)   |
| VH8BACKSfi   | 5' GTC CTC GCA ACT GCG GCC CAG CCG GCC ATG GCC GAG GTT CAG CTT CAG CAG TCT<br>GG 3' (SEQ.ID.NO. 57)   |
| VH10BACKSfi  | 5' GTC CTC GCA ACT GCG GCC CAG CCG GCC ATG GCC GAA GTG CAG CTG CTG GAG WCT<br>GG 3' (SEQ.ID.NO. 58)   |
| VH11BACKSfi  | 5' GTC CTC GCA ACT GCG GCC CAG CCG GCC ATG GCC CAG ATC CAG TTG CTG CAG TCT<br>GG 3' (SEQ.ID.NO. 59)   |

**FIG. 12-1**

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Mouse J<sub>H</sub> forward primers (containing 1/2 linker-sequence and AscI-site):

|              |   |
|--------------|---|
| VH1FOR2LiAsc | 5' ACC GCC AGA GGC GCG CCC ACC TGA ACC GCC TCC ACC TGA GGA GAC GGT<br>GAC CGT GGT CCC TTG GCC CC 3' (SEQ.ID.NO. 60) |
| JH1FORLiAsc  | 5' ACC GCC AGA GGC GCG CCC ACC TGA ACC GCC TCC ACC TGA GGA GAC GGT<br>GAC CGT GGT CCC 3' (SEQ.ID.NO. 61)            |
| JH2FORLiAsc  | 5' ACC GCC AGA GGC GCG CCC ACC TGA ACC GCC TCC ACC TGA GGA GAC TGT<br>GAG AGT GGT GCC 3' (SEQ.ID.NO. 62)            |
| JH3FORLiAsc  | 5' ACC GCC AGA GGC GCG CCC ACC TGA ACC GCC TCC ACC TGC AGA GAC AGT<br>GAC CAG AGT CCC 3' (SEQ.ID.NO. 63)            |
| JH4FORLiAsc  | 5' ACC GCC AGA GGC GCG CCC ACC TGA ACC GCC TCC ACC TGA GGA GAC GGT<br>GAC TGA GGT TCC 3' (SEQ.ID.NO. 64)            |

---

IUPAC-Code: M=A/C, W=A/T, R=A/G, Y=C/T, S=C/G, K=G/T, H=A/C/T, D=A/G/T, V=A/C/G, B=T/C/G.

**FIG. 12-2**

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**Primers for cloning mouse V<sub>K</sub> genes**

*Mouse V<sub>K</sub> back primers (containing AscI-site and 1/2 linker-sequence):*

|                |  |
|----------------|--|
| VK2BACK-LiAscI | 5' GGT TCA GAT GGG CGC GCC TCT GGC GGT GGC GGA TCG GAC ATT GAG<br>CTC ACC CAG TCT CCA 3' (SEQ.ID.NO. 65) |
| VK1BACKLi Asc  | 5' GGT TCA GAT GGG CGC GCC TCT GGC GGT GGC GGA TCG GAC ATT GTG<br>ATG WCA CAG TCT CC 3' (SEQ.ID.NO. 66)  |
| VK2BACKLi Asc  | 5' GGT TCA GAT GGG CGC GCC TCT GGC GGT GGC GGA TCG GAT GTT KTG<br>ATG ACC CAA ACT CC 3' (SEQ.ID.NO. 67)  |
| VK3BACKLi Asc  | 5' GGT TCA GAT GGG CGC GCC TCT GGC GGT GGC GGA TCG GAT ATT GTG<br>ATR ACB CAG GCW GC 3' (SEQ.ID.NO. 68)  |
| VK4BACKLi Asc  | 5' GGT TCA GAT GGG CGC GCC TCT GGC GGT GGC GGA TCG GAC ATT GTG<br>CTG ACM CAR TCT GC 3' (SEQ.ID.NO. 69)  |
| VK5BACKLi Asc  | 5' GGT TCA GAT GGG CGC GCC TCT GGC GGT GGC GGA TCG SAA AWT GTK<br>CTC ACC CAG TCT CC 3' (SEQ.ID.NO. 70)  |
| VK6BACKLi Asc  | 5' GGT TCA GAT GGG CGC GCC TCT GGC GGT GGC GGA TCG GAY ATY VWG<br>ATG ACM CAG WCT CC 3' (SEQ.ID.NO. 71)  |
| VK7BACKLi Asc  | 5' GGT TCA GAT GGG CGC GCC TCT GGC GGT GGC GGA TCG CAA ATT GTT<br>CTC ACC CAG TCT CC 3' (SEQ.ID.NO. 72)  |
| VK8BACKLi Asc  | 5' GGT TCA GAT GGG CGC GCC TCT GGC GGT GGC GGA TCG TCA TTA TTG<br>CAG GTG CTT GTG GG 3' (SEQ.ID.NO. 73)  |

**FIG. 13-1**

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*Mouse J<sub>K</sub> forward primers (containing NotI-site):*

|          |   |
|----------|---|
| JK1NOT10 | 5' GAG TCA TTC TGC GGC CGC CCG TTT GAT TTC CAG CTT GGT GCC 3' |
|          | (SEQ.ID.NO. 74)   |
| JK2NOT10 | 5' GAG TCA TTC TGC GGC CGC CCG TTT TAT TTC CAG CTT GGT CCC 3' |
|          | (SEQ.ID.NO. 75)   |
| JK3NOT10 | 5' GAG TCA TTC TGC GGC CGC CCG TTT TAT TTC CAG TCT GGT CCC 3' |
|          | (SEQ.ID.NO. 76)   |
| JK4NOT10 | 5' GAG TCA TTC TGC GGC CGC CCG TTT TAT TTC CAA CTT TGT CCC 3' |
|          | (SEQ.ID.NO. 77)   |
| JK5NOT10 | 5' GAG TCA TTC TGC GGC CGC CCG TTT CAG CTC CAG CTT GGT CCC 3' |
|          | (SEQ.ID.NO. 78)   |

---

IUPAC-Code: K=G/T, M=A/C, W=A/T, R=A/G, Y=C/T, S=C/G, H=A/C/T, D=A/G/T, V=A/C/G, B=T/C/G.

**FIG. 13-2**



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|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| +1  | D   | R   | V   | T   | I   | T   | C   | K   | A   | S   | Q   | S   | V   | S   | N   |
| 451 | GAC | AGG | GTT | ACC | ATA | ACC | TGC | AAG | GCC | AGT | CAG | AGT | GTG | AGT | AAT |
| +1  | D   | V   | A   | W   | Y   | Q   | Q   | K   | P   | G   | Q   | S   | P   | K   | L   |
| 496 | GAT | GTA | GCT | TGG | TAC | CAA | CAG | AAG | CCG | GGG | CAG | TCT | CCT | AAA | CTA |
| +1  | L   | M   | Y   | Y   | A   | S   | N   | R   | Y   | T   | G   | V   | P   | D   | R   |
| 541 | CTG | ATG | TAC | TAT | GCA | TCC | AAT | CGC | TAC | ACT | GGA | GTC | CCT | GAT | CGC |
| +1  | F   | T   | G   | S   | G   | Y   | G   | T   | D   | F   | T   | F   | T   | I   | S   |
| 586 | TTC | ACT | GGC | AGT | GGA | TAT | GGG | ACG | GAT | TTC | ACT | TTC | ACC | ATC | AGC |
| +1  | T   | V   | Q   | A   | E   | D   | L   | A   | V   | Y   | F   | C   | Q   | Q   | D   |
| 631 | ACT | GTG | CAG | GCT | GAA | GAC | CTG | GCA | GTT | TAT | TTC | TGT | CAG | CAG | GAT |
| +1  | Y   | G   | S   | P   | P   | T   | F   | G   | G   | G   | T   | K   | L   | E   | I   |
| 676 | TAT | GGC | TCT | CCT | CCC | ACG | TTC | GGA | GGG | GGC | ACC | AAG | CTG | GAA | ATT |
| +1  | K   | R   |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 721 | AAA | CGG |     |     |     |     |     |     |     |     |     |     |     |     |     |

**FIG. 14-2**

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VH

|    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| +1 | E   | V   | Q   | L   | V   | E   | S   | G   | G   | G   | L   | V   | K   | P   | G   |
| 1  | GAA | GTG | CAG | CTG | GTG | GAG | TCT | GGG | GGA | GGC | CTA | GTG | AAG | CCT | GGA |

+1

|    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| G  | S   | L   | K   | L   | S   | C   | A   | A   | S   | G   | F   | T   | F   | S   |     |
| 46 | GGG | TCC | CTG | AAA | CTC | TCC | TGT | GCA | GCC | TCT | GGA | TTC | ACT | TTC | AGT |

+1

|    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| T  | Y   | T   | M   | S   | W   | V   | R   | Q   | T   | P   | E   | K   | R   | L   |     |
| 91 | ACC | TAT | ACC | ATG | TCT | TGG | GTT | CGC | CAG | ACT | CCG | GAG | AAG | AGG | CTG |

+1

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| E   | W   | V   | A   | T   | I   | S   | S   | G   | G   | S   | Y   | T   | Y   | Y   |     |
| 136 | GAG | TGG | GTC | GCA | ACC | ATT | AGT | AGT | GGT | GGT | AGT | TAC | ACC | TAC | TAT |

+1

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| P   | D   | S   | V   | R   | G   | R   | F   | T   | I   | S   | R   | D   | N   | A   |     |
| 181 | CCA | GAC | AGT | GTG | AGG | GGC | CGA | TTC | ACC | ATC | TCC | AGA | GAC | AAT | GCC |

+1

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| K   | N   | T   | L   | Y   | L   | Q   | M   | S   | S   | L   | K   | S   | E   | D   |     |
| 226 | AAG | AAC | ACC | CTG | TAC | CTG | CAA | ATG | AGC | AGT | CTG | AAG | TCT | GAG | GAC |

+1

|     |     |     |     |     |     |     |     |          |            |            |            |            |            |            |            |
|-----|-----|-----|-----|-----|-----|-----|-----|----------|------------|------------|------------|------------|------------|------------|------------|
| T   | A   | M   | Y   | Y   | C   | T   | R   | <b>D</b> | <b>G</b>   | <b>G</b>   | <b>H</b>   | <b>G</b>   | <b>Y</b>   | <b>G</b>   |            |
| 271 | ACA | GCC | ATG | TAT | TAC | TGT | ACA | AGA      | <b>GAT</b> | <b>GGG</b> | <b>GGA</b> | <b>CAC</b> | <b>GGG</b> | <b>TAC</b> | <b>GGT</b> |

+1

|          |            |            |            |            |            |     |     |     |     |     |     |     |     |     |     |
|----------|------------|------------|------------|------------|------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| <b>S</b> | <b>S</b>   | <b>F</b>   | <b>D</b>   | <b>Y</b>   | W          | G   | Q   | G   | T   | T   | L   | T   | V   | S   |     |
| 316      | <b>AGT</b> | <b>AGC</b> | <b>TTT</b> | <b>GAC</b> | <b>TAC</b> | TGG | GGC | CAA | GGC | ACC | ACT | CTC | ACA | GTC | TCC |

*linker*

+1

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| S   | G   | G   | G   | G   | S   | G   | G   | R   | A   | S   | G   | G   | G   | G   |     |
| 361 | TCA | GGT | GGA | GGC | GGT | TCA | GGT | GGG | CGC | GCC | TCT | GGC | GGT | GGC | GGA |

VL

+1

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| S   | Q   | I   | V   | L   | T   | Q   | S   | P   | L   | S   | L   | P   | V   | S   |     |
| 406 | TCG | CAA | ATT | GTG | CTC | ACC | CAG | TCT | CCA | CTC | TCC | CTG | CCT | GTC | AGT |

FIG. 15-1

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|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| +1  | L   | G   | D   | Q   | A   | S   | I   | S   | C   | R   | S   | S   | Q   | S   | I   |
| 451 | CTT | GGA | GAT | CAA | GCC | TCC | ATC | TCT | TGC | AGA | TCT | AGT | CAG | AGC | ATT |
| +1  | V   | H   | S   | N   | G   | N   | T   | Y   | L   | E   | W   | Y   | L   | Q   | K   |
| 496 | GTA | CAT | AGT | AAT | GGA | AAC | ACC | TAT | TTA | GAA | TGG | TAC | CTG | CAG | AAA |
| +1  | P   | G   | Q   | S   | P   | K   | L   | L   | I   | Y   | K   | V   | S   | N   | R   |
| 541 | CCA | GGC | CAG | TCT | CCA | AAG | CTC | CTG | ATC | TAC | AAA | GTT | TCC | AAC | CGA |
| +1  | F   | S   | G   | V   | P   | D   | K   | F   | S   | G   | S   | G   | S   | G   | T   |
| 586 | TTT | TCT | GGG | GTC | CCA | GAC | AAA | TTC | AGT | GGC | AGT | GGA | TCA | GGG | ACA |
| +1  | D   | F   | T   | L   | K   | I   | S   | R   | V   | E   | A   | E   | D   | L   | G   |
| 631 | GAT | TTC | ACA | CTC | AAG | ATC | AGC | AGA | GTG | GAG | GCT | GAG | GAT | CTG | GGA |
| +1  | V   | Y   | Y   | C   | F   | Q   | G   | S   | H   | V   | P   | W   | T   | F   | G   |
| 676 | GTT | TAT | TAC | TGC | TTT | CAA | GGT | TCA | CAT | GTT | CCG | TGG | ACG | TTC | GGT |
| +1  | G   | G   | T   | K   | L   | E   | I   | K   | R   |     |     |     |     |     |     |
| 721 | GGA | GGC | ACC | AAG | CTG | GAA | ATC | AAA | CGG |     |     |     |     |     |     |

**FIG. 15-2**



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```
+1  E  V  Q  L  Q  E  S  G  G  G  L  V  K  P  G
1  GAG GTG CAG CTT CAG GAG TCA GGG GGA GGC TTA GTG AAG CCT GGA

+1  G  S  L  K  L  S  C  A  A  S  G  F  T  F  S
46  GGG TCC CTG AAA CTC TCC TGT GCA GCC TCT GGA TTC ACT TTC AGT

+1  S  Y  T  M  S  W  V  R  Q  T  P  E  K  R  L
91  AGC TAT ACC ATG TCT TGG GTT CGC CAG ACT CCG GAG AAG AGG CTG

+1  E  W  V  A  T  I  S  S  G  G  S  S  T  Y  Y
136 GAG TGG GTC GCA ACC ATT AGT AGT GGT GGT AGT TCC ACC TAC TAT

+1  P  D  S  V  K  G  R  F  T  I  S  R  D  N  A
181 CCA GAC AGT GTG AAG GGC CGA TTC ACC ATC TCC AGA GAC AAT GCC

+1  K  N  T  L  Y  L  Q  M  S  S  L  R  S  E  D
226 AAG AAC ACC CTG TAC CTG CAA ATG AGC AGT CTG AGG TCT GAG GAC

+1  T  A  M  Y  Y  C  T  R  E  G  G  G  F  T  V
271 ACA GCC ATG TAT TAC TGT ACA AGA GAG GGG GGT GGT TTC ACC GTC

+1  N  W  Y  F  D  V  W  G  A  G  T  L  V  T  V
316 AAC TGG TAC TTC GAT GTC TGG GGC GCA GGG ACT CTG GTC ACT GTC

      linker
+1  S  A  G  G  G  G  S  G  G  R  A  S  G  G  G
361 TCT GCA GGT GGA GGC GGT TCA GGT GGG CGC GCC TCT GGC GGT GGC

      VL
+1  G  S  E  N  V  L  T  Q  S  P  A  S  L  A  V
406 GGA TCG GAA AAT GTG CTC ACC CAG TCT CCA GCT TCT TTG GCT GTG
```

**FIG. 16-1**

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```
+1 S L G Q R A T I S C R A S E S  
451 TCT CTA GGG CAG AGG GCC ACC ATA TCC TGC AGA GCC AGT GAA AGT  
  
+1 V D S Y G Y N F M H W Y Q Q I  
496 GTT GAT AGT TAT GGC TAT AAT TTT ATG CAC TGG TAT CAG CAG ATA  
  
+1 P G Q P P K L L I Y R A S N L  
541 CCA GGA CAG CCA CCC AAA CTC CTC ATC TAT CGT GCA TCC AAC CTA  
  
+1 E S G I P A R F S G S G S R T  
586 GAG TCT GGG ATC CCT GCC AGG TTC AGT GGC AGT GGG TCT AGG ACA  
  
+1 D F T L T I N P V E A D D V A  
631 GAC TTC ACC CTC ACC ATT AAT CCT GTG GAG GCT GAT GAT GTT GCA  
  
+1 T Y Y C Q Q S N E D P L T F G  
676 ACC TAT TAC TGT CAG CAA AGT AAT GAG GAT CCG CTC ACG TTC GGT  
  
+1 T G T R L E I K R  
721 ACT GGG ACC AGA CTG GAA ATA AAA CGG
```

**FIG. 16-2**

**FIG. 17-1**

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```

+1   R   A   S   E   S   V   D   S   Y   G   K   S   F   M   H   W   Y   Q   Q   K
481  AGA GCC AGT GAA AGT GTT GAT AGT TAT GGC AAG AGT TTT ATG CAC TGG TAC CAG CAG AAA
    TCT CGG TCA CTT TCA CAA CTA TCA ATA CCG TTC TCA AAA TAC GTG ACC ATG GTC GTC TTT

+1   P   G   Q   P   P   K   L   L   L   I   Y   R   A   S   N   L   E   S   G   I   P
541  CCA GGG CAG CCA CCC AAA CTC CTC ATC TAT CGT GCA TCC AAC CTA GAA TCT GGG ATC CCT
    GGT CCC GTC GGT GGG TTT GAG GAG TAG ATA GCA CGT AGG TTG GAT CTT AGA CCC TAG GGA

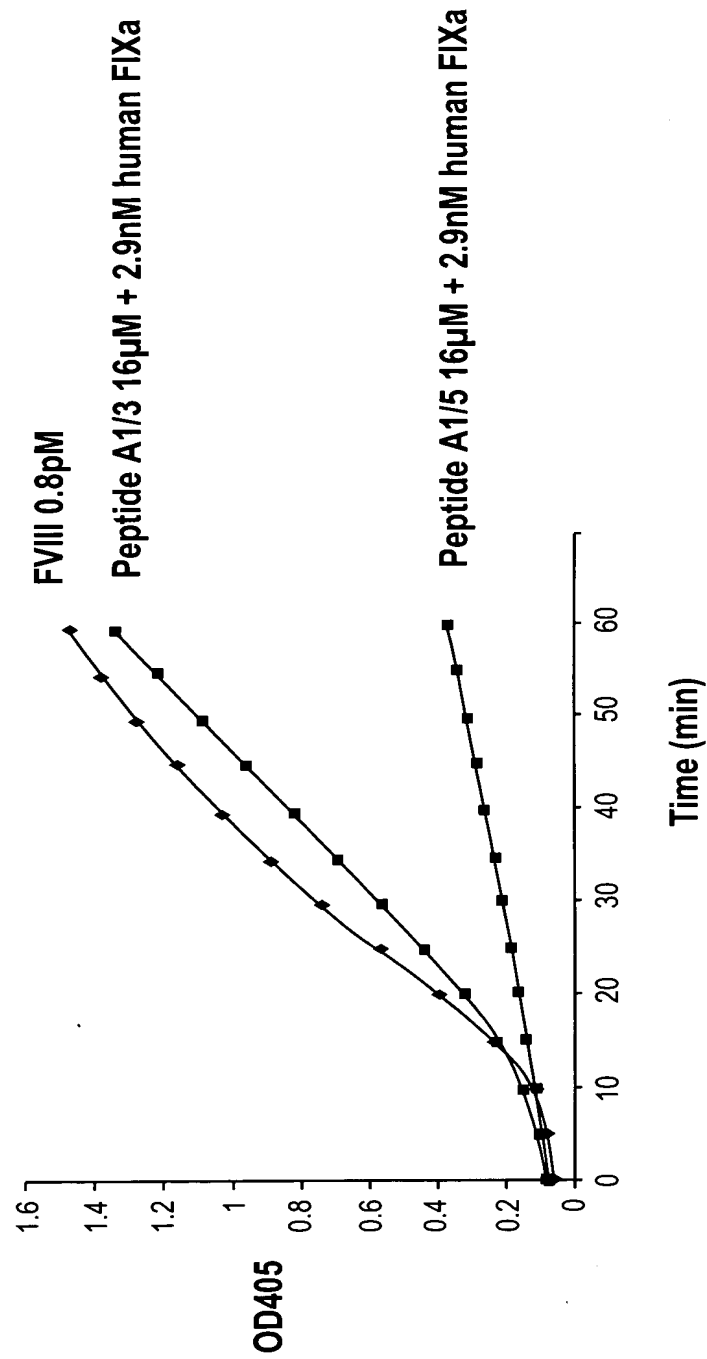
+1   A   R   F   S   G   S   G   S   R   T   D   F   T   L   T   I   N   P   V   E
601  GCC AGG TTC AGT GGC AGT GGC TCT AGG ACA GAC TTC ACC CTC ACC ATT AAT CCT GTG GAG
    CGG TCC AAG TCA CCG TCA CCC AGA TCC TGT CTG AAG TGG GAG TGG TAA TTA GGA CAC CTC

+1   A   D   D   V   A   T   Y   Y   C   Q   Q   S   N   E   D   P   L   T   F   G
661  GCT GAT GAT GTT GCN ACC TAT TAC TGT TGT CAG CAA AGT AAT GAG GAT CCC CTC ACG TTC GGT
    CGA CTA CTA CAA CGN TGG ATA ATG ACA GTC GTT TCA TTA CTC CTC GAG TGC AAG CCA

+1   A   G   T   R   L   E   I   K   R
721  GCT GGG ACC AGA CTG GAA ATA AAA CGG
    CGA CCC TGG TCT GAC CTT TAT TTT GCC
    
```

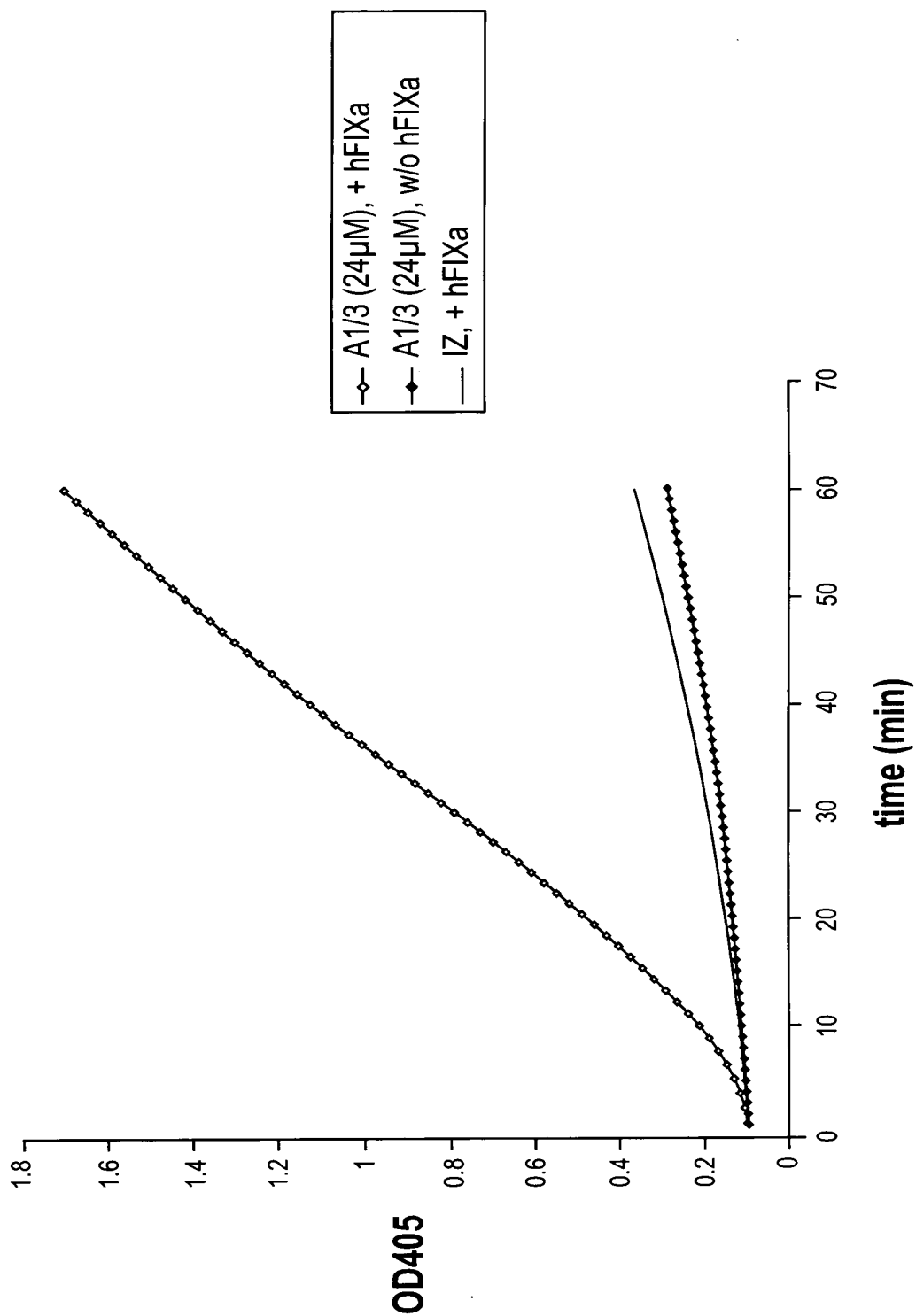
FIG. 17-2

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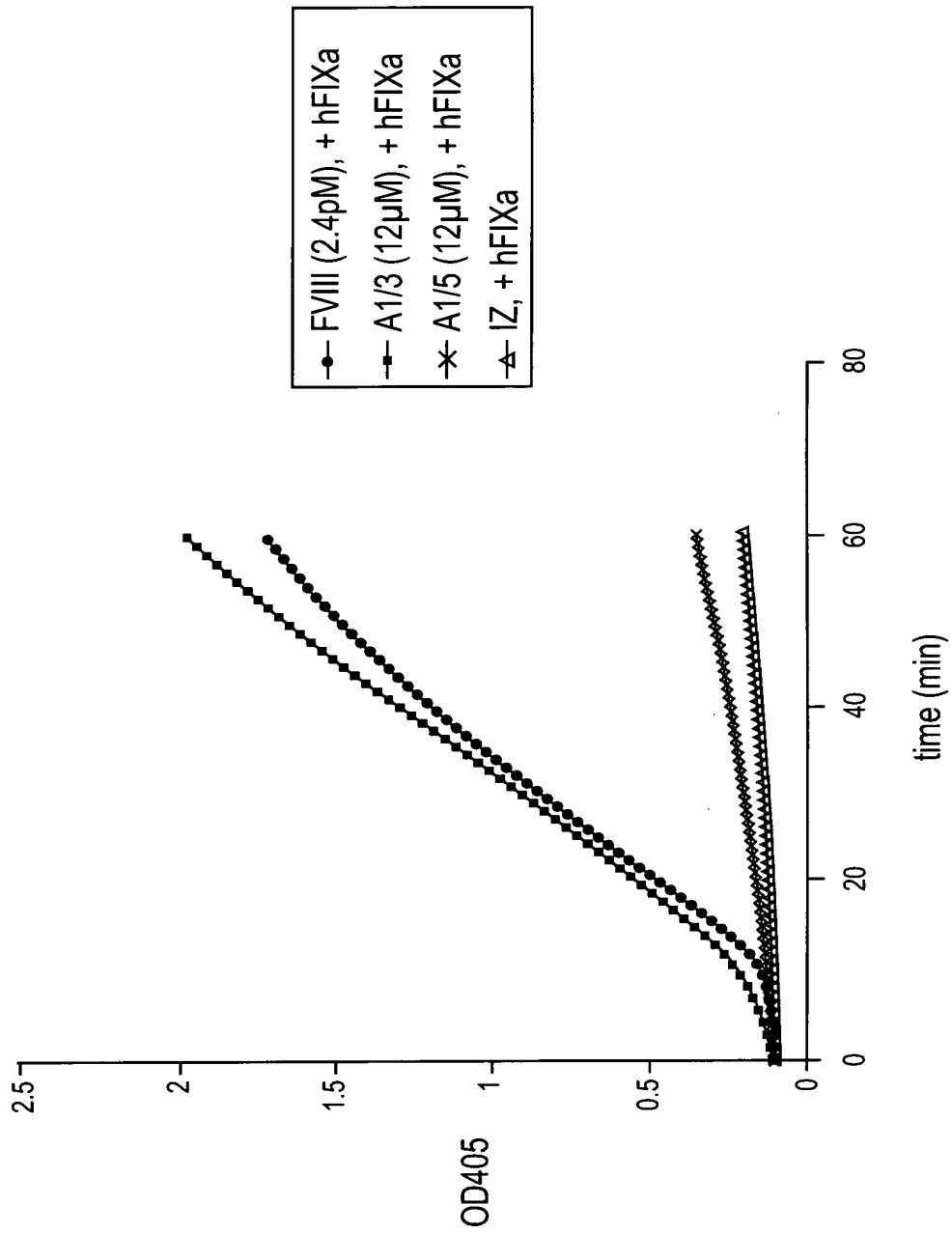
**FIG. 18**

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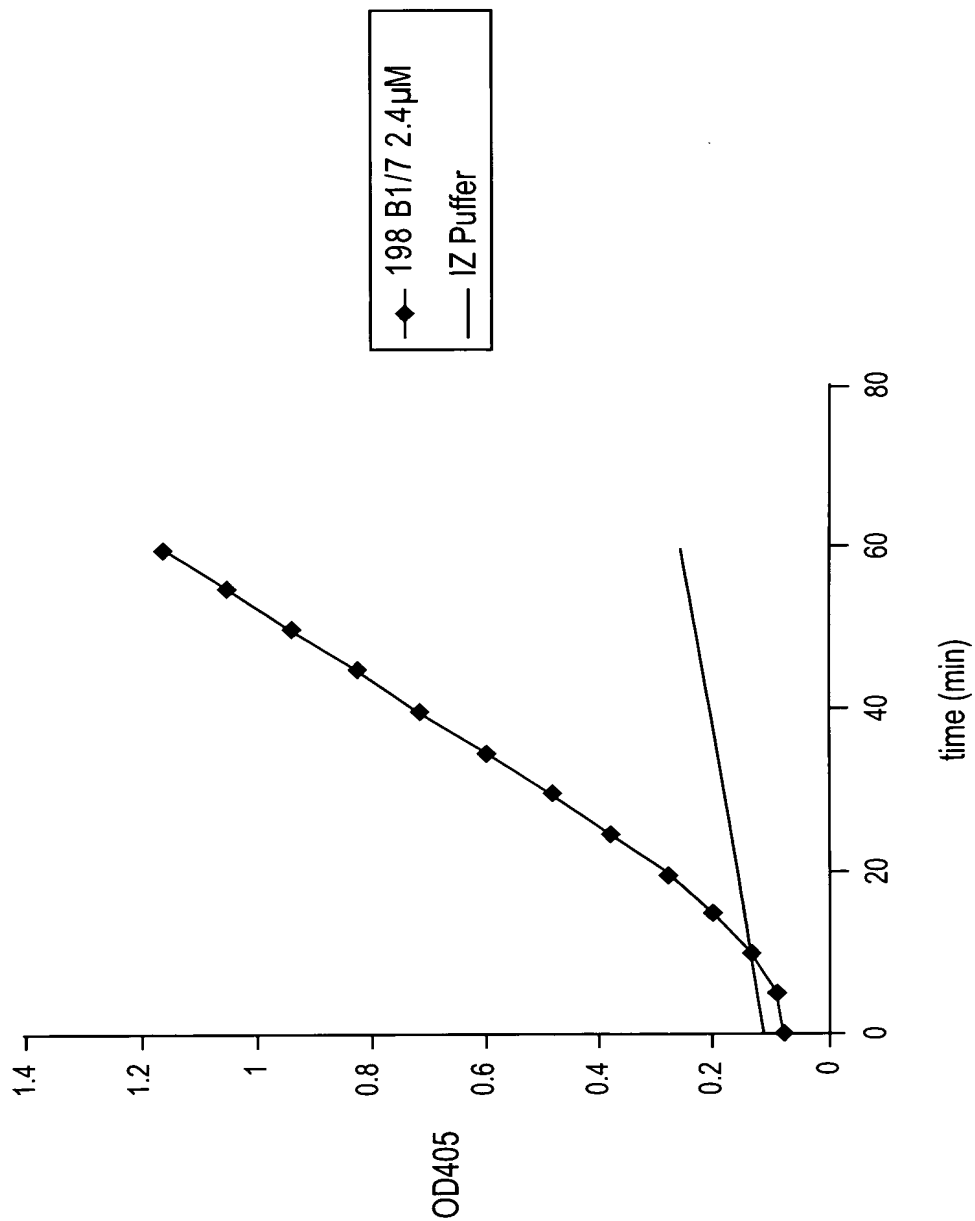
**FIG. 19**

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**FIG. 20**

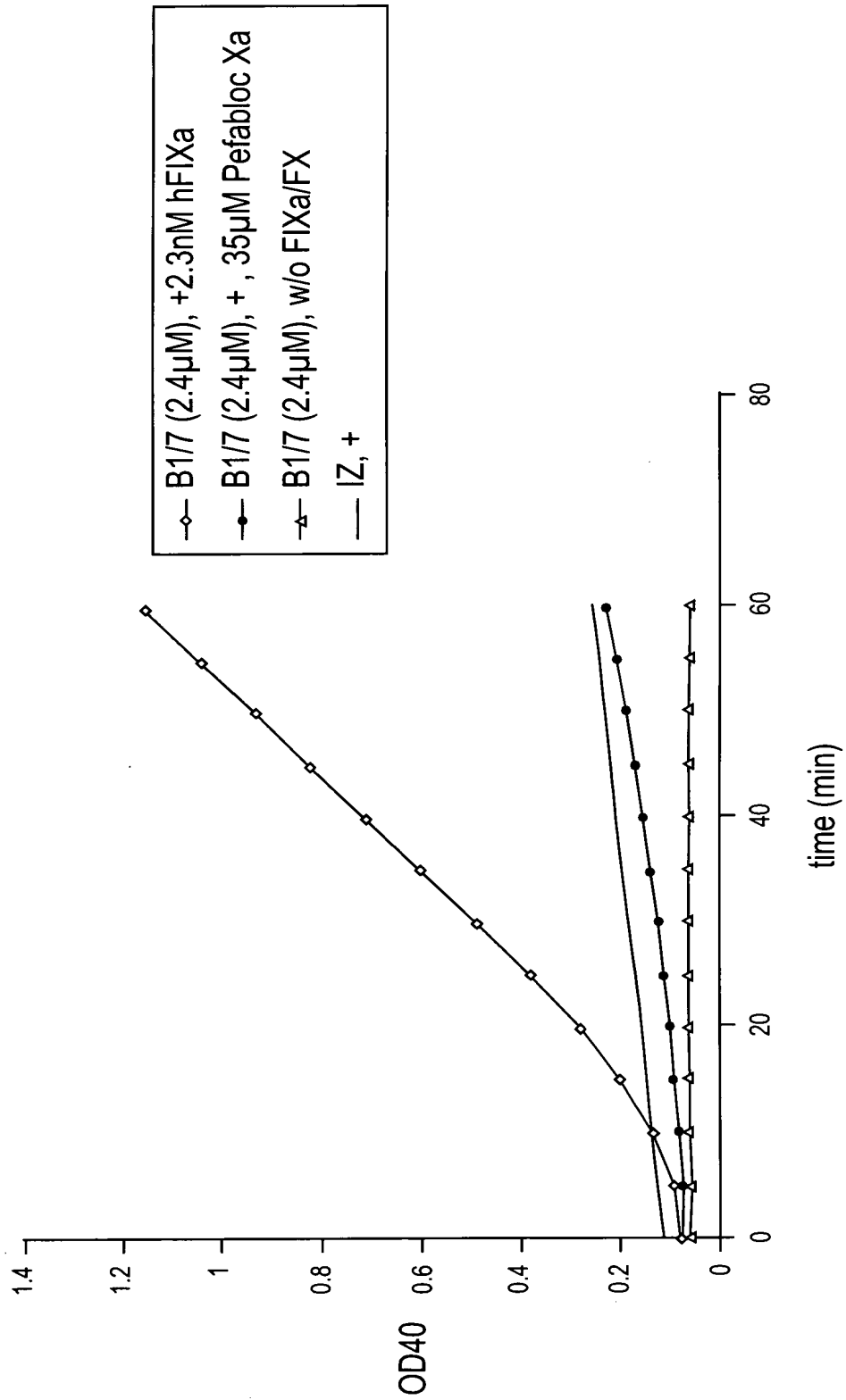
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**FIG. 21**

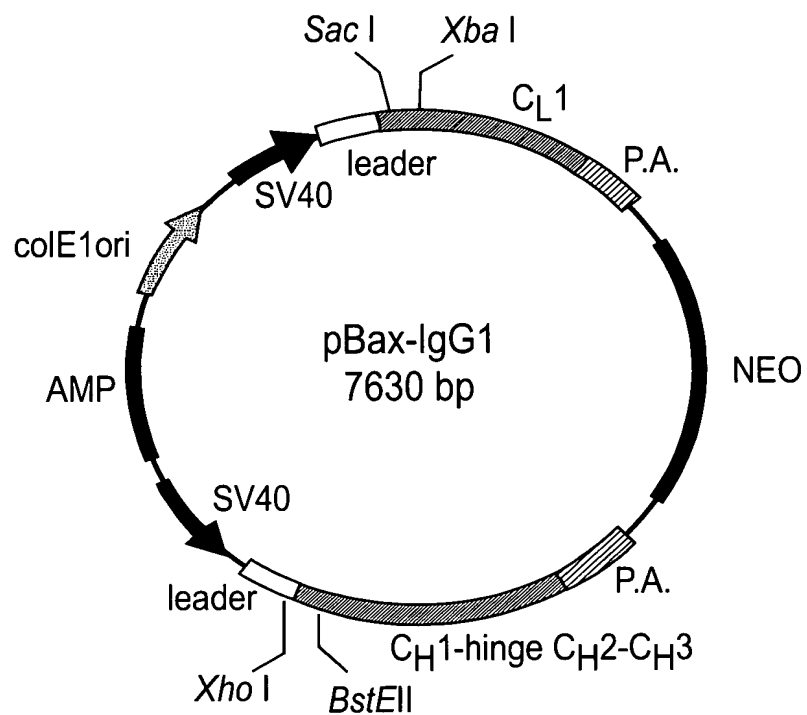


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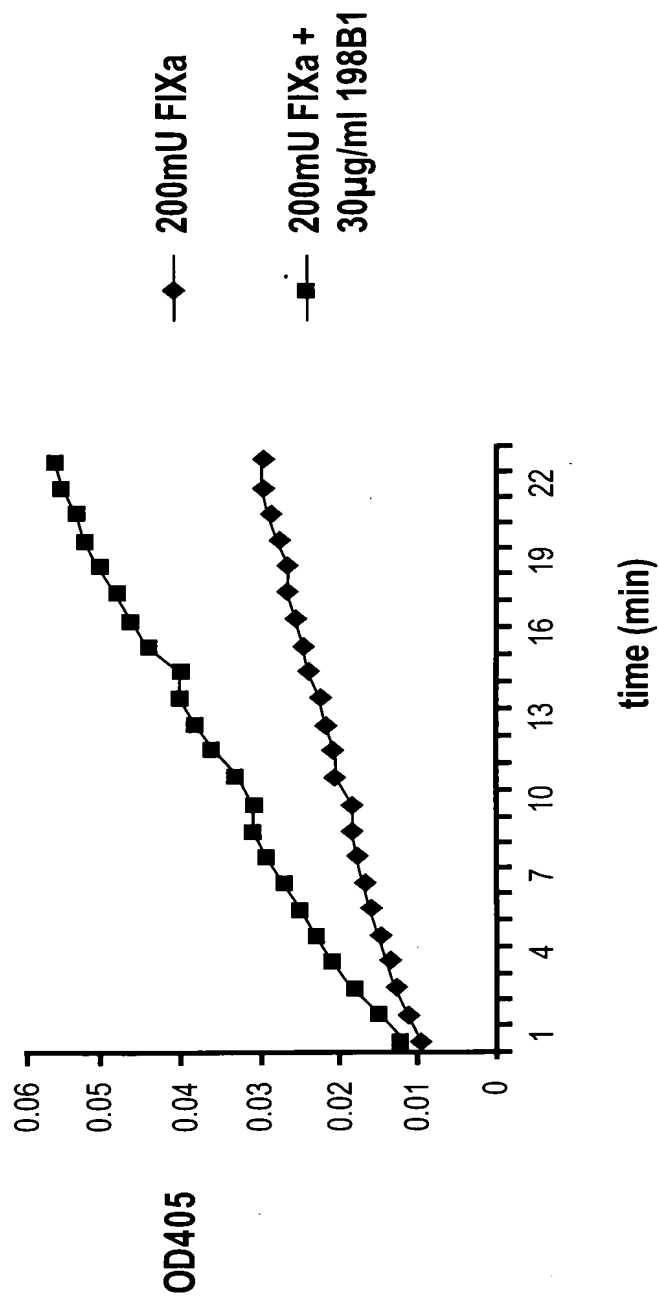
**FIG. 22**

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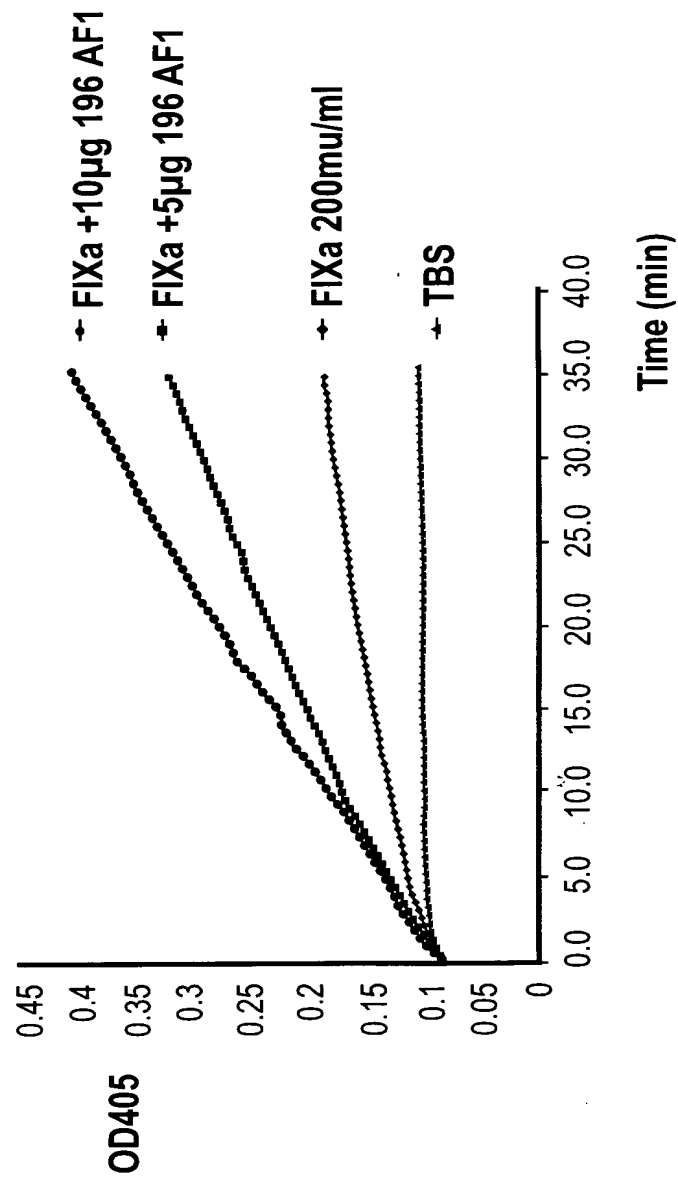
**FIG. 23**

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**FIG. 24A**

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**FIG. 24B**

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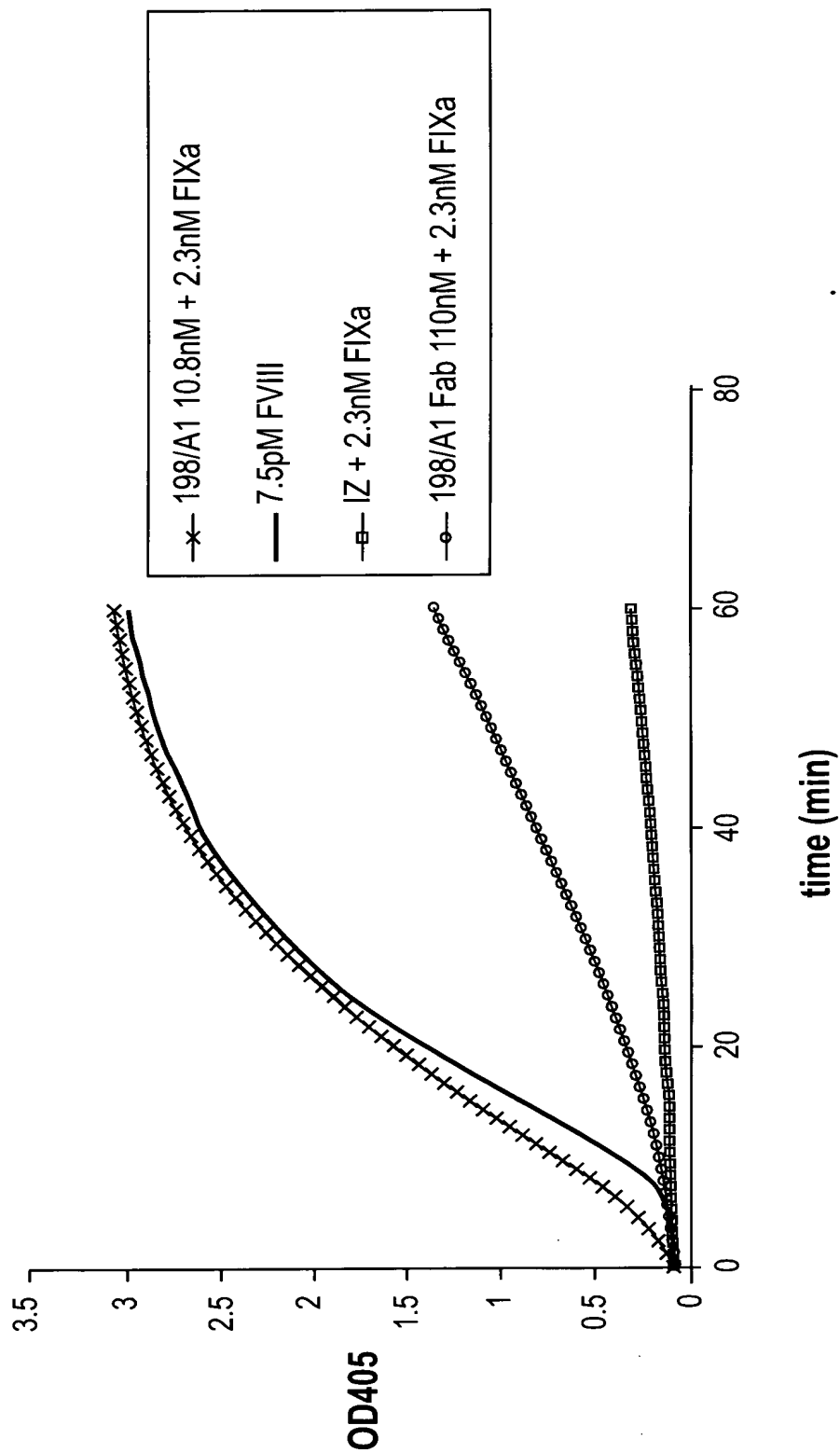


FIG. 25

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| PelB-Leader |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| +1          | M   | K   | Y   | L   | L   | P   | T   | A   | A   | A   | G   | L   | L   | L   |
| 1           | ATG | AAA | TAC | CTA | TTG | CCT | ACG | GCA | GCC | GCT | GGA | TTG | TTA | TTA |
|             | TAC | TTT | ATG | GAT | AAC | GGA | TGC | CGT | CGG | CGA | CCT | AAC | AAT | AAT |
| VH          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| +1          | L   | A   | A   | Q   | P   | A   | M   | A   | E   | V   | K   | L   | V   | E   |
| 43          | CTC | GCG | GCC | CAG | CCG | GCC | ATG | GCG | GAG | GTG | AAG | CTG | GTG | GAG |
|             | GAG | CGC | CGG | GTC | GGC | CGG | TAC | CGC | CTC | CAC | TTC | GAC | CAC | CTC |
| +1          | S   | G   | G   | G   | L   | V   | K   | P   | G   | G   | S   | L   | K   | L   |
| 85          | TCT | GGG | GGA | GGC | TTA | GTG | AAG | CCT | GGA | GGG | TCC | CTG | AAA | CTC |
|             | AGA | CCC | CCT | CCG | AAT | CAC | TTC | GGA | CCT | CCC | AGG | GAC | TTT | GAG |
| +1          | S   | C   | A   | A   | S   | G   | F   | T   | F   | S   | S   | Y   | T   | M   |
| 127         | TCC | TGT | GCA | GCC | TCT | GGA | TTC | ACT | TTC | AGT | AGC | TAT | ACC | ATG |
|             | AGG | ACA | CGT | CGG | AGA | CCT | AAG | TGA | AAG | TCA | TCG | ATA | TGG | TAC |
| +1          | S   | W   | V   | R   | Q   | T   | P   | E   | K   | R   | L   | E   | W   | V   |
| 169         | TCT | TGG | GTT | CGC | CAG | ACT | CCG | GAG | AAG | AGG | CTG | GAG | TGG | GTC |
|             | AGA | ACC | CAA | GCG | GTC | TGA | GGC | CTC | TTC | TCC | GAC | CTC | ACC | CAG |
| +1          | A   | T   | I   | S   | S   | G   | G   | S   | S   | T   | Y   | Y   | P   | D   |
| 211         | GCA | ACC | ATT | AGT | AGT | GGN | GGT | AGT | TCC | ACC | TAC | TAT | CCA | GAC |
|             | CGT | TGG | TAA | TCA | TCA | CCN | CCA | TCA | AGG | TGG | ATG | ATA | GGT | CTG |
| +1          | S   | V   | K   | G   | R   | F   | T   | I   | S   | R   | D   | N   | A   | K   |
| 253         | AGT | GTG | AAG | GGC | CGA | TTC | ACC | ATC | TCC | AGA | GAC | AAT | GCC | AAG |
|             | TCA | CAC | TTC | CCG | GCT | AAG | TGG | TAG | AGG | TCT | CTG | TTA | CGG | TTC |
| +1          | N   | T   | L   | Y   | L   | Q   | M   | S   | S   | L   | R   | S   | E   | D   |
| 295         | AAC | ACC | CTG | TAC | CTG | CAA | ATG | AGC | AGT | CTG | AGG | TCT | GAG | GAC |
|             | TTG | TGG | GAC | ATG | GAC | GTT | TAC | TCG | TCA | GAC | TCC | AGA | CTC | CTG |
| +1          | T   | A   | M   | Y   | Y   | C   | T   | R   | E   | G   | G   | G   | F   | T   |
| 337         | ACA | GCC | ATG | TAT | TAC | TGT | ACA | AGA | GAG | GGG | GGT | GGT | TTC | ACC |
|             | TGT | CGG | TAC | ATA | ATG | ACA | TGT | TCT | CTC | CCC | CCA | CCA | AAG | TGG |
| +1          | V   | N   | W   | Y   | F   | D   | V   | W   | G   | A   | G   | T   | S   | V   |
| 379         | GTC | AAC | TGG | TAC | TTC | GAT | GTC | TGG | GGC | GCA | GGA | ACC | TCA | GTC |
|             | CAG | TTG | ACC | ATG | AAG | CTA | CAG | ACC | CCG | CGT | CCT | TGG | AGT | CAG |
| linker      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| +1          | T   | V   | S   | S   | G   | G   | G   | G   | S   | G   | G   | R   | A   | S   |
| 421         | ACC | GTC | TCC | TCA | GGT | GGA | GGC | GGT | TCA | GGT | GGG | CGC | GCC | TCT |
|             | TGG | CAG | AGG | AGT | CCA | CCT | CCG | CCA | AGT | CCA | CCC | GCG | CGG | AGA |

FIG. 26-1

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|     |     |     |     |     |     | VL     |     |     |     |                      |     |     |     |     |
|-----|-----|-----|-----|-----|-----|--------|-----|-----|-----|----------------------|-----|-----|-----|-----|
| +1  | G   | G   | G   | G   | S   | D      | I   | V   | L   | T                    | Q   | S   | P   | A   |
| 463 | GGC | GGT | GGC | GGA | TCG | GAC    | ATT | GTG | CTG | ACA                  | CAG | TCT | CCA | GCT |
|     | CCG | CCA | CCG | CCT | AGC | CTG    | TAA | CAC | GAC | TGT                  | GTC | AGA | GGT | CGA |
| +1  | S   | L   | A   | V   | S   | L      | G   | Q   | R   | A                    | T   | I   | S   | C   |
| 505 | TCT | TTG | GCT | GTG | TCT | CTA    | GGG | CAG | AGG | GCC                  | ACC | ATA | TCC | TGC |
|     | AGA | AAC | CGA | CAC | AGA | GAT    | CCC | GTC | TCC | CGG                  | TGG | TAT | AGG | ACG |
| +1  | R   | A   | S   | E   | S   | V      | D   | S   | Y   | G                    | Y   | N   | F   | M   |
| 547 | AGA | GCC | AGT | GAA | AGT | GTT    | GAT | AGT | TAT | GGC                  | TAT | AAT | TTT | ATG |
|     | TCT | CGG | TCA | CTT | TCA | CAA    | CTA | TCA | ATA | CCG                  | ATA | TTA | AAA | TAC |
| +1  | H   | W   | Y   | Q   | Q   | I      | P   | G   | Q   | P                    | P   | K   | L   | L   |
| 589 | CAC | TGG | TAT | CAG | CAG | ATA    | CCA | GGA | CAG | CCA                  | CCC | AAA | CTC | CTC |
|     | GTG | ACC | ATA | GTC | GTC | TAT    | GGT | CCT | GTC | GGT                  | GGG | TTT | GAG | GAG |
| +1  | I   | Y   | R   | A   | S   | N      | L   | E   | S   | G                    | I   | P   | A   | R   |
| 631 | ATC | TAT | CGT | GCA | TCC | AAC    | CTA | GAG | TCT | GGG                  | ATC | CCT | GCC | AGG |
|     | TAG | ATA | GCA | CGT | AGG | TTG    | GAT | CTC | AGA | CCC                  | TAG | GGA | CGG | TCC |
| +1  | F   | S   | G   | S   | G   | S      | R   | T   | D   | F                    | T   | L   | T   | I   |
| 673 | TTC | AGT | GGC | AGT | GGG | TCT    | AGG | ACA | GAC | TTC                  | ACC | CTC | ACC | ATT |
|     | AAG | TCA | CCG | TCA | CCC | AGA    | TCC | TGT | CTG | AAG                  | TGG | GAG | TGG | TAA |
| +1  | N   | P   | V   | E   | A   | D      | D   | V   | A   | T                    | Y   | Y   | C   | Q   |
| 715 | AAT | CCT | GTG | GAG | GCT | GAT    | GAT | GTT | GCA | ACC                  | TAT | TAC | TGT | CAG |
|     | TTA | GGA | CAC | CTC | CGA | CTA    | CTA | CAA | CGT | TGG                  | ATA | ATG | ACA | GTC |
| +1  | Q   | S   | N   | E   | D   | P      | L   | T   | F   | G                    | T   | G   | T   | R   |
| 757 | CAA | AGT | AAT | GAG | GAT | CCG    | CTC | ACG | TTC | GGT                  | ACT | GGG | ACC | AGA |
|     | GTT | TCA | TTA | CTC | CTA | GGC    | GAG | TGC | AAG | CCA                  | TGA | CCC | TGG | TCT |
|     |     |     |     |     |     | Spacer |     |     |     | Alkaline phosphatase |     |     |     |     |
| +1  | L   | E   | I   | K   | R   | A      | A   | A   | A   | R                    | A   | P   | E   | M   |
| 799 | CTG | GAA | ATA | AAA | CGG | GCG    | GCC | GCA | GCC | CGG                  | GCA | CCA | GAA | ATG |
|     | GAC | CTT | TAT | TTT | GCC | CGC    | CGG | CGT | CGG | GCC                  | CGT | GGT | CTT | TAC |
| +1  | P   | V   | L   | E   | N   | R      | A   | A   | Q   | G                    | D   | I   | T   | A   |
| 841 | CCT | GTT | CTG | GAA | AAC | CGG    | GCT | GCT | CAG | GGC                  | GAT | ATT | ACT | GCA |
|     | GGA | CAA | GAC | CTT | TTG | GCC    | CGA | CGA | GTC | CCG                  | CTA | TAA | TGA | CGT |
| +1  | P   | G   | G   | A   | R   | R      | L   | T   | G   | D                    | Q   | T   | A   | A   |
| 883 | CCC | GGC | GGT | GCT | CGC | CGT    | TTA | ACG | GGT | GAT                  | CAG | ACT | GCC | GCT |
|     | GGG | CCG | CCA | CGA | GCG | GCA    | AAT | TGC | CCA | CTA                  | GTC | TGA | CGG | CGA |
| +1  | L   | R   | D   | S   | L   | S      | D   | K   | P   | A                    | K   | N   | I   | I   |
| 925 | CTG | CGT | GAT | TCT | CTT | AGC    | GAT | AAA | CCT | GCA                  | AAA | AAT | ATT | ATT |
|     | GAC | GCA | CTA | AGA | GAA | TCG    | CTA | TTT | GGA | CGT                  | TTT | TTA | TAA | TAA |

**FIG. 26-2**

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|      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| +1   | L   | L   | I   | G   | D   | G   | M   | G   | D   | S   | E   | I   | T   | A   |
| 463  | TTG | CTG | ATT | GGC | GAT | GGG | ATG | GGG | GAC | TCG | GAA | ATT | ACT | GCC |
|      | AAC | GAC | TAA | CCG | CTA | CCC | TAC | CCC | CTG | AGC | CTT | TAA | TGA | CGG |
| +1   | A   | R   | N   | Y   | A   | E   | G   | A   | G   | G   | F   | F   | K   | G   |
| 505  | GCA | CGT | AAT | TAT | GCC | GAA | GGT | GCG | GGC | GGC | TTT | TTT | AAA | GGT |
|      | CGT | GCA | TTA | ATA | CGG | CTT | CCA | CGC | CCG | CCG | AAA | AAA | TTT | CCA |
| +1   | I   | D   | A   | L   | P   | L   | T   | G   | Q   | Y   | T   | H   | Y   | A   |
| 1051 | ATA | GAT | GCC | TTA | CCG | CTT | ACC | GGG | CAA | TAC | ACT | CAC | TAT | GCG |
|      | TAT | CTA | CGG | AAT | GGC | GAA | TGG | CCC | GTT | ATG | TGA | GTG | ATA | CGC |
| +1   | L   | N   | K   | K   | T   | G   | K   | P   | D   | Y   | V   | T   | D   | S   |
| 1093 | CTG | AAT | AAA | AAA | ACC | GGC | AAA | CCG | GAC | TAC | GTC | ACC | GAC | TCG |
|      | GAC | TTA | TTT | TTT | TGG | CCG | TTT | GGC | CTG | ATG | CAG | TGG | CTG | AGC |
| +1   | A   | A   | S   | A   | T   | A   | W   | S   | T   | G   | V   | K   | T   | Y   |
| 1135 | GCT | GCA | TCA | GCA | ACC | GCC | TGG | TCA | ACC | GGT | GTC | AAA | ACC | TAT |
|      | CGA | CGT | AGT | CGT | TGG | CGG | ACC | AGT | TGG | CCA | CAG | TTT | TGG | ATA |
| +1   | N   | G   | A   | L   | G   | V   | D   | I   | H   | E   | K   | D   | H   | P   |
| 1177 | AAC | GGC | GCG | CTG | GGC | GTC | GAT | ATT | CAC | GAA | AAA | GAT | CAC | CCA |
|      | TTG | CCG | CGC | GAC | CCG | CAG | CTA | TAA | GTG | CTT | TTT | CTA | GTG | GGT |
| +1   | T   | I   | L   | E   | M   | A   | K   | A   | A   | G   | L   | A   | T   | G   |
| 1219 | ACG | ATT | CTG | GAA | ATG | GCA | AAA | GCC | GCA | GGT | CTG | GCG | ACC | GGT |
|      | TGC | TAA | GAC | CTT | TAC | CGT | TTT | CGG | CGT | CCA | GAC | CGC | TGG | CCA |
| +1   | N   | V   | S   | T   | A   | E   | L   | Q   | D   | A   | T   | P   | A   | A   |
| 1261 | AAC | GTT | TCT | ACC | GCA | GAG | TTG | CAG | GAT | GCC | ACG | CCC | GCT | GCG |
|      | TTG | CAA | AGA | TGG | CGT | CTC | AAC | GTC | CTA | CGG | TGC | GGG | CGA | CGC |
| +1   | L   | V   | A   | H   | V   | T   | S   | R   | K   | C   | Y   | G   | P   | S   |
| 1303 | CTG | GTG | GCA | CAT | GTG | ACC | TCG | CGC | AAA | TGC | TAC | GGT | CCG | AGC |
|      | GAC | CAC | CGT | GTA | CAC | TGG | AGC | GCG | TTT | ACG | ATG | CCA | GGC | TCG |
| +1   | A   | T   | S   | E   | K   | C   | P   | G   | N   | A   | L   | E   | K   | G   |
| 1345 | GCG | ACC | AGT | GAA | AAA | TGT | CCG | GGT | AAC | GCT | CTG | GAA | AAA | GGC |
|      | CGC | TGG | TCA | CTT | TTT | ACA | GGC | CCA | TTG | CGA | GAC | CTT | TTT | CCG |
| +1   | G   | K   | G   | S   | I   | T   | E   | Q   | L   | L   | N   | A   | R   | A   |
| 1387 | GGA | AAA | GGA | TCG | ATT | ACC | GAA | CAG | CTG | CTT | AAC | GCT | CGT | GCC |
|      | CCT | TTT | CCT | AGC | TAA | TGG | CTT | GTC | GAC | GAA | TTG | CGA | GCA | CGG |
| +1   | D   | V   | T   | L   | G   | G   | G   | A   | K   | T   | F   | A   | E   | T   |
| 1429 | GAC | GTT | ACG | CTT | GGC | GGC | GGC | GCA | AAA | ACC | TTT | GCT | GAA | ACG |
|      | CTG | CAA | TGC | GAA | CCG | CCG | CCG | CGT | TTT | TGG | AAA | CGA | CTT | TGC |

**FIG. 26-3**



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|      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| +1   | A   | T   | A   | G   | E   | W   | Q   | G   | K   | T   | L   | R   | E   | Q   |
| 1471 | GCA | ACC | GCT | GGT | GAA | TGG | CAG | GGA | AAA | ACG | CTG | CGT | GAA | CAG |
|      | CGT | TGG | CGA | CCA | CTT | ACC | GTC | CCT | TTT | TGC | GAC | GCA | CTT | GTC |
|      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| +1   | A   | Q   | A   | R   | G   | Y   | Q   | L   | V   | S   | D   | A   | A   | S   |
| 1513 | GCA | CAG | GCG | CGT | GGT | TAT | CAG | TTG | GTG | AGC | GAT | GCT | GCC | TCA |
|      | CGT | GTC | CGC | GCA | CCA | ATA | GTC | AAC | CAC | TCG | CTA | CGA | CGG | AGT |
|      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| +1   | L   | N   | S   | V   | T   | E   | A   | N   | Q   | Q   | K   | P   | L   | L   |
| 1555 | CTG | AAT | TCG | GTG | ACG | GAA | GCG | AAT | CAG | CAA | AAA | CCC | CTG | CTT |
|      | GAC | TTA | AGC | CAC | TGC | CTT | CGC | TTA | GTC | GTT | TTT | GGG | GAC | GAA |
|      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| +1   | G   | L   | F   | A   | D   | G   | N   | M   | P   | V   | R   | W   | L   | G   |
| 1177 | GGC | CTG | TTT | GCT | GAC | GGC | AAT | ATG | CCA | GTG | CGC | TGG | CTA | GGA |
|      | CCG | GAC | AAA | CGA | CTG | CCG | TTA | TAC | GGT | CAC | GCG | ACC | GAT | CCT |
|      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| +1   | P   | K   | A   | T   | Y   | H   | G   | N   | I   | D   | K   | P   | A   | V   |
| 1639 | CCG | AAA | GCA | ACG | TAC | CAT | GGC | AAT | ATC | GAT | AAG | CCC | GCA | GTC |
|      | GGC | TTT | CGT | TGC | ATG | GTA | CCG | TTA | TAG | CTA | TTC | GGG | CGT | CAG |
|      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| +1   | T   | C   | T   | P   | N   | P   | Q   | R   | N   | D   | S   | V   | P   | T   |
| 1681 | ACC | TGT | ACG | CCA | AAT | CCG | CAA | CGT | AAT | GAC | AGT | GTA | CCA | ACC |
|      | TGG | ACA | TGC | GGT | TTA | GGC | GTT | GCA | TTA | CTG | TCA | CAT | GGT | TGG |
|      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| +1   | L   | A   | Q   | M   | T   | D   | K   | A   | I   | E   | L   | L   | S   | K   |
| 1723 | CTG | GCG | CAG | ATG | ACC | GAC | AAA | GCC | ATT | GAA | TTG | TTG | AGT | AAA |
|      | GAC | CGC | GTC | TAC | TGG | CTG | TTT | CGG | TAA | CTT | AAC | AAC | TCA | TTT |
|      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| +1   | N   | E   | K   | G   | F   | F   | L   | Q   | V   | E   | G   | A   | S   | I   |
| 1765 | AAT | GAG | AAA | GGC | TTT | TTC | CTG | CAA | GTT | GAA | GGT | GCG | TCA | ATC |
|      | TTA | CTC | TTT | CCG | AAA | AAG | GAC | GTT | CAA | CTT | CCA | CGC | AGT | TAG |
|      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| +1   | D   | K   | Q   | D   | H   | A   | A   | N   | P   | C   | G   | Q   | I   | G   |
| 1807 | GAT | AAA | CAG | GAT | CAT | GCT | GCG | AAT | CCT | TGT | GGG | CAA | ATT | GGC |
|      | CTA | TTT | GTC | CTA | GTA | CGA | CGC | TTA | GGA | ACA | CCC | GTT | TAA | CCG |
|      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| +1   | E   | T   | V   | D   | L   | D   | E   | A   | V   | Q   | R   | A   | L   | E   |
| 1849 | GAG | ACG | GTC | GAT | CTC | GAT | GAA | GCC | GTA | CAA | CGG | GCG | CTG | GAA |
|      | CTC | TGC | CAG | CTA | GAG | CTA | CTT | CGG | CAT | GTT | GCC | CGC | GAC | CTT |
|      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| +1   | F   | A   | K   | K   | E   | G   | N   | T   | L   | V   | I   | V   | T   | A   |
| 1891 | TTC | GCT | AAA | AAG | GAG | GGT | AAC | ACG | CTG | GTC | ATA | GTC | ACC | GCT |
|      | AAG | CGA | TTT | TTC | CTC | CCA | TTG | TGC | GAC | CAG | TAT | CAG | TGG | CGA |
|      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| +1   | D   | H   | A   | H   | A   | S   | Q   | I   | V   | A   | P   | D   | T   | K   |
| 1933 | GAT | CAC | GCC | CAC | GCC | AGC | CAG | ATT | GTT | GCG | CCG | GAT | ACC | AAA |
|      | CTA | GTG | CGG | GTG | CGG | TCG | GTC | TAA | CAA | CGC | GGC | CTA | TGG | TTT |
|      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| +1   | A   | P   | G   | L   | T   | Q   | A   | L   | N   | T   | K   | D   | G   | A   |
| 1975 | GCT | CCG | GGC | CTC | ACC | CAG | GCG | CTA | AAT | ACC | AAA | GAT | GGC | GCA |
|      | CGA | GGC | CCG | GAG | TGG | GTC | CGC | GAT | TTA | TGG | TTT | CTA | CCG | CGT |

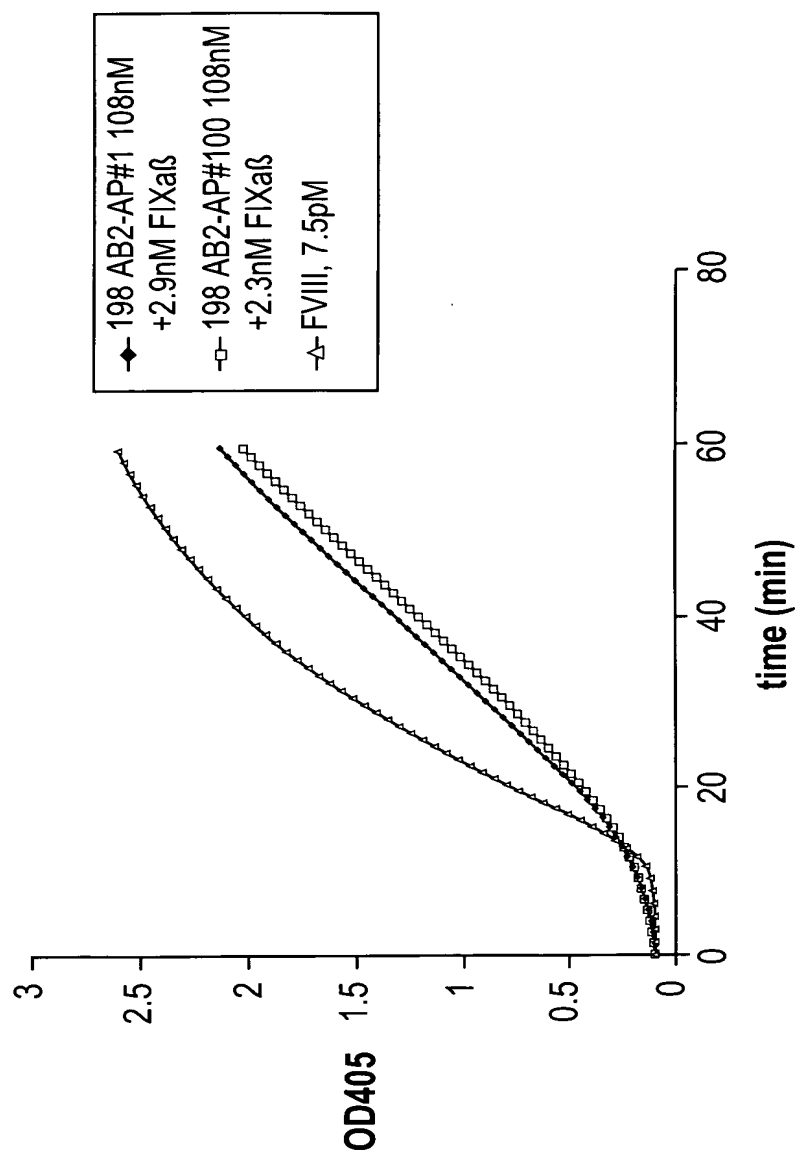
**FIG. 26-4**

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|      |    |     |     |     |     |     |     |     |     |     |     |     |         |     |     |
|------|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---------|-----|-----|
|      | +1 | V   | M   | V   | M   | S   | Y   | G   | N   | S   | E   | E   | D       | S   | Q   |
| 2017 |    | GTG | ATG | GTG | ATG | AGT | TAC | GGG | AAC | TCC | GAA | GAG | GAT     | TCA | CAA |
|      |    | CAC | TAC | CAC | TAC | TCA | ATG | CCC | TTG | AGG | CTT | CTC | CTA     | AGT | GTT |
|      |    |     |     |     |     |     |     |     |     |     |     |     |         |     |     |
|      | +1 | E   | H   | T   | G   | S   | Q   | L   | R   | I   | A   | A   | Y       | G   | P   |
| 2059 |    | GAA | CAT | ACC | GGC | AGT | CAG | TTG | CGT | ATT | GCG | GCG | TAT     | GGC | CCG |
|      |    | CTT | GTA | TGG | CCG | TCA | GTC | AAC | GCA | TAA | CGC | CGC | ATA     | CCG | GGC |
|      |    |     |     |     |     |     |     |     |     |     |     |     |         |     |     |
|      | +1 | H   | A   | A   | N   | V   | V   | G   | L   | T   | D   | Q   | T       | D   | L   |
| 2101 |    | CAT | GCC | GCC | AAT | GTT | GTT | GGA | CTG | ACC | GAC | CAG | ACC     | GAT | CTC |
|      |    | GTA | CGG | CGG | TTA | CAA | CAA | CCT | GAC | TGG | CTG | GTC | TGG     | CTA | GAG |
|      |    |     |     |     |     |     |     |     |     |     |     |     |         |     |     |
|      | +1 | F   | Y   | T   | M   | K   | A   | A   | L   | G   | D   | I   | His tag |     |     |
| 2143 |    | TTC | TAC | ACC | ATG | AAA | GCC | GCT | CTG | GGG | GAT | ATC | A       | H   | H   |
|      |    | AAG | ATG | TGG | TAC | TTT | CGG | CGA | GAC | CCC | CTA | TAG | GCA     | CAC | CAT |
|      |    |     |     |     |     |     |     |     |     |     |     |     |         |     |     |
|      | +1 | H   | H   | H   | H   | *   |     |     |     |     |     |     |         |     |     |
| 2185 |    | CAC | CAT | CAC | CAT | TAA |     |     |     |     |     |     |         |     |     |
|      |    | GTG | GTA | GTG | GTA | ATT |     |     |     |     |     |     |         |     |     |

**FIG. 26-5**

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**FIG. 27**

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|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| +1  | M   | K   | Y   | L   | L   | P   | T   | A   | A   | A   | G   | L   | L   | L   | L   |
| 1   | ATG | AAA | TAC | CTA | TTG | CCT | ACG | GCA | GCC | GCT | GGA | TTG | TTA | TTA | CTC |
|     | TAC | TTT | ATG | GAT | AAC | GGA | TGC | CGT | CGG | CGA | CCT | AAC | AAT | AAT | GAG |
|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| +1  | A   | A   | Q   | P   | A   | M   | A   | E   | V   | K   | L   | V   | E   | S   | G   |
| 46  | GCG | GCC | CAG | CCG | GCC | ATG | GCG | GAG | GTG | AAG | CTG | GTG | GAG | TCT | GGG |
|     | CGC | CGG | GTC | GGC | CGG | TAC | CGC | CTC | CAC | TTC | GAC | CAC | CTC | AGA | CCC |
|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| +1  | G   | G   | L   | V   | K   | P   | G   | G   | S   | L   | K   | L   | S   | C   | A   |
| 91  | GGA | GGC | TTA | GTG | AAG | CCT | GGA | GGG | TCC | CTG | AAA | CTC | TCC | TGT | GCA |
|     | CCT | CCG | AAT | CAC | TTC | GGA | CCT | CCC | AGG | GAC | TTT | GAG | AGG | ACA | CGT |
|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| +1  | A   | S   | G   | F   | T   | F   | S   | S   | Y   | T   | M   | S   | W   | V   | R   |
| 136 | GCC | TCT | GGA | TTC | ACT | TTC | AGT | AGC | TAT | ACC | ATG | TCT | TGG | GTT | CGC |
|     | CGG | AGA | CCT | AAG | TGA | AAG | TCA | TCG | ATA | TGG | TAC | AGA | ACC | CAA | GCG |
|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| +1  | Q   | T   | P   | E   | K   | R   | L   | E   | W   | V   | A   | T   | I   | S   | S   |
| 181 | CAG | ACT | CCG | GAG | AAG | AGG | CTG | GAG | TGG | GTC | GCA | ACC | ATT | AGT | AGT |
|     | GTC | TGA | GGC | CTC | TTC | TCC | GAC | CTC | ACC | CAG | CGT | TGG | TAA | TCA | TCA |
|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| +1  | G   | G   | S   | S   | T   | Y   | Y   | P   | D   | S   | V   | K   | G   | R   | F   |
| 226 | GGN | GGT | AGT | TCC | ACC | TAC | TAT | CCA | GAC | AGT | GTG | AAG | GGC | CGA | TTC |
|     | CCN | CCA | TCA | AGG | TGG | ATG | ATA | GGT | CTG | TCA | CAC | TTC | CCG | GCT | AAG |
|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| +1  | T   | I   | S   | R   | D   | N   | A   | K   | N   | T   | L   | Y   | L   | Q   | M   |
| 271 | ACC | ATC | TCC | AGA | GAC | AAT | GCC | AAG | AAC | ACC | CTG | TAC | CTG | CAA | ATG |
|     | TGG | TAG | AGG | TCT | CTG | TTA | CGG | TTC | TTG | TGG | GAC | ATG | GAC | GTT | TAC |
|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| +1  | S   | S   | L   | R   | S   | E   | D   | T   | A   | M   | Y   | Y   | C   | T   | R   |
| 316 | AGC | AGT | CTG | AGG | TCT | GAG | GAC | ACA | GCC | ATG | TAT | TAC | TGT | ACA | AGA |
|     | TCG | TCA | GAC | TCC | AGA | CTC | CTG | TGT | CGG | TAC | ATA | ATG | ACA | TGT | TCT |
|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| +1  | E   | G   | G   | G   | F   | T   | V   | N   | W   | Y   | F   | D   | V   | W   | G   |
| 361 | GAG | GGG | GGT | GGT | TTC | ACC | GTC | AAC | TGG | TAC | TTC | GAT | GTC | TGG | GGC |
|     | CTC | CCC | CCA | CCA | AAG | TGG | CAG | TTG | ACC | ATG | AAG | CTA | CAG | ACC | CCG |

Linker

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| +1  | A   | G   | T   | S   | V   | T   | V   | S   | S   | G   | G   | G   | G   | S   | G   |
| 406 | GCA | GGA | ACC | TCA | GTC | ACC | GTC | TCC | TCA | GGT | GGA | GGC | GGT | TCA | GGT |
|     | CGT | CCT | TGG | AGT | CAG | TGG | CAG | AGG | AGT | CCA | CCT | CCG | CCA | AGT | CCA |

VL

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| +1  | G   | R   | A   | S   | G   | G   | G   | G   | S   | D   | I   | V   | L   | T   | Q   |
| 451 | GGG | CGC | GCC | TCT | GGC | GGT | GGC | GGA | TCG | GAC | ATT | GTG | CTG | ACA | CAG |
|     | CCC | GCG | CGG | AGA | CCG | CCA | CCG | CCT | AGC | CTG | TAA | CAC | GAC | TGT | GTC |

**FIG. 28-1**

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|     |        |     |     |         |     |     |     |     |     |     |     |       |     |     |     |
|-----|--------|-----|-----|---------|-----|-----|-----|-----|-----|-----|-----|-------|-----|-----|-----|
| +1  | X      | P   | A   | S       | L   | A   | V   | S   | L   | G   | Q   | R     | A   | T   | I   |
| 496 | TNT    | CCA | GCT | TCT     | TTG | GCT | GTG | TCT | CTA | GGG | CAG | AGG   | GCC | ACC | ATA |
|     | ANA    | GGT | CGA | AGA     | AAC | CGA | CAC | AGA | GAT | CCC | GTC | TCC   | CGG | TGG | TAT |
| +1  | S      | C   | R   | A       | S   | E   | S   | V   | D   | S   | Y   | G     | Y   | N   | F   |
| 541 | TCN    | TGC | AGA | GCC     | AGT | GAA | AGT | GTT | GAT | AGT | TAT | GGC   | TAT | AAT | TTT |
|     | AGN    | ACG | TCT | CGG     | TCA | CTT | TCA | CAA | CTA | TCA | ATA | CCG   | ATA | TTA | AAA |
| +1  | M      | H   | W   | Y       | Q   | Q   | I   | P   | G   | Q   | P   | P     | K   | L   | L   |
| 586 | ATG    | CAC | TGG | TAT     | CAG | CAG | ATA | CCA | GGA | CAG | CCA | CCC   | AAA | CTC | CTC |
|     | TAC    | GTG | ACC | ATA     | GTC | GTC | TAT | GGT | CCT | GTC | GGT | GGG   | TTT | GAG | GAG |
| +1  | I      | Y   | R   | A       | S   | N   | L   | E   | S   | G   | I   | P     | A   | R   | F   |
| 631 | ATC    | TAT | CGT | GCA     | TCC | AAC | CTA | GAG | TCT | GGG | ATC | CCT   | GCC | AGG | TTC |
|     | TAG    | ATA | GCA | CGT     | AGG | TTG | GAT | CTC | AGA | CCC | TAG | GGA   | CGG | TCC | AAG |
| +1  | S      | G   | S   | G       | S   | R   | T   | D   | F   | T   | L   | T     | I   | N   | P   |
| 676 | AGT    | GGC | AGT | GGG     | TCT | AGG | ACA | GAC | TTC | ACC | CTC | ACC   | ATT | AAT | CCT |
|     | TCA    | CCG | TCA | CCC     | AGA | TCC | TGT | CTG | AAG | TGG | GAG | TGG   | TAA | TTA | GGA |
| +1  | V      | E   | A   | D       | D   | V   | A   | T   | Y   | Y   | C   | Q     | Q   | S   | N   |
| 721 | GTG    | GAG | GCT | GAT     | GAT | GTT | GCA | ACC | TAT | TAC | TGT | CAG   | CAA | AGT | AAT |
|     | CAC    | CTC | CGA | CTA     | CTA | CAA | CGT | TGG | ATA | ATG | ACA | GTC   | GTT | TCA | TTA |
| +1  | E      | D   | P   | L       | T   | F   | G   | T   | G   | T   | R   | L     | E   | I   | K   |
| 766 | GAG    | GAT | CCG | CTC     | ACG | TTC | GGT | ACT | GGG | ACC | AGA | CTG   | GAA | ATA | AAA |
|     | CTC    | CTA | GGC | GAG     | TGC | AAG | CCA | TGA | CCC | TGG | TCT | GAC   | CTT | TAT | TTT |
|     | Spacer |     |     | Hinge   |     |     |     |     |     |     |     | Helix |     |     |     |
| +1  | R      | A   | A   | A       | P   | K   | P   | S   | T   | P   | P   | G     | S   | S   | R   |
| 811 | CGG    | GCG | GCC | GCA     | CCG | AAG | CCT | TCC | ACT | CCG | CCC | GGG   | TCT | TCC | CGT |
|     | GCC    | CGC | CGG | CGT     | GGC | TTC | GGA | AGG | TGA | GGC | GGG | CCC   | AGA | AGG | GCA |
| +1  | M      | K   | Q   | L       | E   | D   | K   | V   | E   | E   | L   | L     | S   | K   | N   |
| 856 | ATG    | AAA | CAG | CTG     | GAA | GAC | AAA | GTA | GAG | GAG | CTC | CTT   | AGC | AAG | AAC |
|     | TAC    | TTT | GTC | GAC     | CTT | CTG | TTT | CAT | CTC | CTC | GAG | GAA   | TCG | TTC | TTG |
| +1  | Y      | H   | L   | E       | N   | E   | V   | A   | R   | L   | K   | K     | L   | V   | G   |
| 901 | TAC    | CAT | CTA | GAA     | AAC | GAG | GTA | GCT | CGT | CTG | AAA | AAG   | CTT | GTT | GGT |
|     | ATG    | GTA | GAT | CTT     | TTG | CTC | CAT | CGA | GCA | GAC | TTT | TTC   | GAA | CAA | CCA |
|     | Spacer |     |     | His-tag |     |     |     |     |     |     |     |       |     |     |     |
| +1  | E      | R   | G   | G       | H   | H   | H   | H   | H   | H   | *   |       |     |     |     |
| 946 | GAA    | CGT | GGT | GGT     | CAC | CAT | CAC | CAT | CAC | CAT | TAA |       |     |     |     |
|     | CTT    | GCA | CCA | CCA     | GTG | GTA | GTG | GTA | GTG | GTA | ATT |       |     |     |     |

**FIG. 28-2**

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PelB-Leader

|    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| +1 | M   | K   | Y   | L   | L   | P   | T   | A   | A   | A   | G   | L   | L   | L   |
| 1  | ATG | AAA | TAC | CTA | TTG | CCT | ACG | GCA | GCC | GCT | GGA | TTG | TTA | TTA |
|    | TAC | TTT | ATG | GAT | AAC | GGA | TGC | CGT | CGG | CGA | CCT | AAC | AAT | AAT |

|    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|    |     |     |     |     |     |     |     |     |     | VH  |     |     |     |     |
| +1 | L   | A   | A   | Q   | P   | A   | M   | A   | E   | V   | Q   | L   | Q   | Q   |
| 43 | CTC | GCG | GCC | CAG | CCG | GCC | ATG | GCC | GAG | GTT | CAG | CTT | CAG | CAG |
|    | GAG | CGC | CGG | GTC | GGC | CGG | TAC | CGG | CTC | CAA | GTC | GAA | GTC | GTC |

|    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| +1 | S   | G   | P   | E   | L   | V   | K   | P   | G   | A   | S   | V   | K   | I   |
| 85 | TCT | GGA | CCT | GAG | CTG | GTG | AAG | CCC | GGG | GCC | TCA | GTG | AAG | ATT |
|    | AGA | CCT | GGA | CTC | GAC | CAC | TTC | GGG | CCC | CGG | AGT | CAC | TTC | TAA |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| +1  | S   | C   | K   | A   | S   | G   | Y   | A   | F   | S   | S   | S   | W   | M   |
| 127 | TCC | TGC | AAA | GCT | TCT | GGC | TAC | GCA | TTC | AGT | AGC | TCT | TGG | ATG |
|     | AGG | ACG | TTT | CGA | AGA | CCG | ATG | CGT | AAG | TCA | TCG | AGA | ACC | TAC |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| +1  | N   | W   | V   | K   | Q   | R   | P   | G   | Q   | G   | L   | E   | W   | I   |
| 169 | AAC | TGG | GTG | AAG | CAG | AGG | CCT | GGA | CAG | GGT | CTT | GAG | TGG | ATT |
|     | TTG | ACC | CAC | TTC | GTC | TCC | GGA | CCT | GTC | CCA | GAA | CTC | ACC | TAA |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| +1  | G   | R   | I   | Y   | P   | G   | N   | G   | D   | T   | N   | Y   | N   | G   |
| 211 | GGA | CGG | ATT | TAT | CCT | GGA | AAT | GGA | GAT | ACT | AAC | TAC | AAT | GGG |
|     | CCT | GCC | TAA | ATA | GGA | CCT | TTA | CCT | CTA | TGA | TTG | ATG | TTA | CCC |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| +1  | K   | F   | K   | G   | K   | A   | T   | L   | T   | A   | D   | K   | S   | S   |
| 253 | AAG | TTC | AAG | GGC | AAG | GCC | ACA | CTG | ACT | GCA | GAC | AAA | TCC | TCC |
|     | TTC | AAG | TTC | CCG | TTC | CGG | TGT | GAC | TGA | CGT | CTG | TTT | AGG | AGG |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| +1  | S   | T   | A   | Y   | M   | Q   | L   | S   | S   | L   | T   | S   | V   | D   |
| 295 | AGC | ACA | GCC | TAC | ATG | CAG | CTC | AGC | AGC | CTG | ACC | TCT | GTG | GAC |
|     | TCG | TGT | CGG | ATG | TAC | GTC | GAG | TCG | TCG | GAC | TGG | AGA | CAC | CTG |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| +1  | S   | A   | V   | Y   | F   | C   | A   | D   | G   | N   | V   | Y   | Y   | Y   |
| 337 | TCT | GCG | GTC | TAT | TTC | TGT | GCA | GAT | GGT | AAC | GTA | TAT | TAC | TAT |
|     | AGA | CGC | CAG | ATA | AAG | ACA | CGT | CTA | CCA | TTG | CAT | ATA | ATG | ATA |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| +1  | A   | M   | D   | Y   | W   | G   | Q   | G   | T   | S   | V   | T   | V   | S   |
| 379 | GCT | ATG | GAC | TAC | TGG | GGT | CAA | GGA | ACC | TCA | GTC | ACC | GTC | TCC |
|     | CGA | TAC | CTG | ATG | ACC | CCA | GTT | CCT | TGG | AGT | CAG | TGG | CAG | AGG |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| +1  | S   | G   | G   | G   | G   | S   | G   | G   | R   | A   | S   | G   | G   | G   |
| 421 | TCA | GGT | GGA | GGC | GGT | TCA | GGT | GGG | CGC | GCC | TCT | GGC | GGT | GGC |
|     | AGT | CCA | CCT | CCG | CCA | AGT | CCA | CCC | GCG | CGG | AGA | CCG | CCA | CCG |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| +1  | G   | S   | Q   | I   | V   | L   | T   | Q   | S   | P   | A   | S   | L   | A   |
| 463 | GGA | TCG | CAA | ATT | GTT | CTC | ACC | CAG | TCT | CCT | GCT | TCC | TTA | GCT |
|     | CCT | AGC | GTT | TAA | CAA | GAG | TGG | GTC | AGA | GGA | CGA | AGG | AAT | CGA |

FIG. 29-1

**FIG. 29-2**

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|      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| +1   | Y   | A   | E   | G   | A   | G   | G   | F   | F   | K   | G   | I   | D   | A   |
| 1009 | TAT | GCC | GAA | GGT | GCG | GGC | GGC | TTT | TTT | AAA | GGT | ATA | GAT | GCC |
|      | ATA | CGG | CTT | CCA | CGC | CCG | CCG | AAA | AAA | TTT | CCA | TAT | CTA | CGG |
| +1   | L   | P   | L   | T   | G   | Q   | Y   | T   | H   | Y   | A   | L   | N   | K   |
| 1051 | TTA | CCG | CTT | ACC | GGG | CAA | TAC | ACT | CAC | TAT | GCG | CTG | AAT | AAA |
|      | AAT | GGC | GAA | TGG | CCC | GTT | ATG | TGA | GTG | ATA | CGC | GAC | TTA | TTT |
| +1   | K   | T   | G   | K   | P   | D   | Y   | V   | T   | D   | S   | A   | A   | S   |
| 1093 | AAA | ACC | GGC | AAA | CCG | GAC | TAC | GTC | ACC | GAC | TCG | GCT | GCA | TCA |
|      | TTT | TGG | CCG | TTT | GGC | CTG | ATG | CAG | TGG | CTG | AGC | CGA | CGT | AGT |
| +1   | A   | T   | A   | W   | S   | T   | G   | V   | K   | T   | Y   | N   | G   | A   |
| 1135 | GCA | ACC | GCC | TGG | TCA | ACC | GGT | GTC | AAA | ACC | TAT | AAC | GGC | GCG |
|      | CGT | TGG | CGG | ACC | AGT | TGG | CCA | CAG | TTT | TGG | ATA | TTG | CCG | CGC |
| +1   | L   | G   | V   | D   | I   | H   | E   | K   | D   | H   | P   | T   | I   | L   |
| 1177 | CTG | GGC | GTC | GAT | ATT | CAC | GAA | AAA | GAT | CAC | CCA | ACG | ATT | CTG |
|      | GAC | CCG | CAG | CTA | TAA | GTG | CTT | TTT | CTA | GTG | GGT | TGC | TAA | GAC |
| +1   | E   | M   | A   | K   | A   | A   | G   | L   | A   | T   | G   | N   | V   | S   |
| 1219 | GAA | ATG | GCA | AAA | GCC | GCA | GGT | CTG | GCG | ACC | GGT | AAC | GTT | TCT |
|      | CTT | TAC | CGT | TTT | CGG | CGT | CCA | GAC | CGC | TGG | CCA | TTG | CAA | AGA |
| +1   | T   | A   | E   | L   | Q   | D   | A   | T   | P   | A   | A   | L   | V   | A   |
| 1261 | ACC | GCA | GAG | TTG | CAG | GAT | GCC | ACG | CCC | GCT | GCG | CTG | GTG | GCA |
|      | TGG | CGT | CTC | AAC | GTC | CTA | CGG | TGC | GGG | CGA | CGC | GAC | CAC | CGT |
| +1   | H   | V   | T   | S   | R   | K   | C   | Y   | G   | P   | S   | A   | T   | S   |
| 1303 | CAT | GTG | ACC | TCG | CGC | AAA | TGC | TAC | GGT | CCG | AGC | GCG | ACC | AGT |
|      | GTA | CAC | TGG | AGC | GCG | TTT | ACG | ATG | CCA | GGC | TCG | CGC | TGG | TCA |
| +1   | E   | K   | C   | P   | G   | N   | A   | L   | E   | K   | G   | G   | K   | G   |
| 1345 | GAA | AAA | TGT | CCG | GGT | AAC | GCT | CTG | GAA | AAA | GGC | GGA | AAA | GGA |
|      | CTT | TTT | ACA | GGC | CCA | TTG | CGA | GAC | CTT | TTT | CCG | CCT | TTT | CCT |
| +1   | S   | I   | T   | E   | Q   | L   | L   | N   | A   | R   | A   | D   | V   | T   |
| 1387 | TCG | ATT | ACC | GAA | CAG | CTG | CTT | AAC | GCT | CGT | GCC | GAC | GTT | ACG |
|      | AGC | TAA | TGG | CTT | GTC | GAC | GAA | TTG | CGA | GCA | CGG | CTG | CAA | TGC |
| +1   | L   | G   | G   | G   | A   | K   | T   | F   | A   | E   | T   | A   | T   | A   |
| 1429 | CTT | GGC | GGC | GGC | GCA | AAA | ACC | TTT | GCT | GAA | ACG | GCA | ACC | GCT |
|      | GAA | CCG | CCG | CCG | CGT | TTT | TGG | AAA | CGA | CTT | TGC | CGT | TGG | CGA |
| +1   | G   | E   | W   | Q   | G   | K   | T   | L   | R   | E   | Q   | A   | Q   | A   |
| 1471 | GGT | GAA | TGG | CAG | GGA | AAA | ACG | CTG | CGT | GAA | CAG | GCA | CAG | GCG |
|      | CCA | CTT | ACC | GTC | CCT | TTT | TGC | GAC | GCA | CTT | GTC | CGT | GTC | CGC |

**FIG. 29-3**



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|      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| +1   | R   | G   | Y   | Q   | L   | V   | S   | D   | A   | A   | S   | L   | N   | S   |
| 1513 | CGT | GGT | TAT | CAG | TTG | GTG | AGC | GAT | GCT | GCC | TCA | CTG | AAT | TCG |
|      | GCA | CCA | ATA | GTC | AAC | CAC | TCG | CTA | CGA | CGG | AGT | GAC | TTA | AGC |
|      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| +1   | V   | T   | E   | A   | N   | Q   | Q   | K   | P   | L   | L   | G   | L   | F   |
| 1555 | GTG | ACG | GAA | GCG | AAT | CAG | CAA | AAA | CCC | CTG | CTT | GGC | CTG | TTT |
|      | CAC | TGC | CTT | CGC | TTA | GTC | GTT | TTT | GGG | GAC | GAA | CCG | GAC | AAA |
|      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| +1   | A   | D   | G   | N   | M   | P   | V   | R   | W   | L   | G   | P   | K   | A   |
| 1597 | GCT | GAC | GGC | AAT | ATG | CCA | GTG | CGC | TGG | CTA | GGA | CCG | AAA | GCA |
|      | CGA | CTG | CCG | TTA | TAC | GGT | CAC | GCG | ACC | GAT | CCT | GGC | TTT | CGT |
|      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| +1   | T   | Y   | H   | G   | N   | I   | D   | K   | P   | A   | V   | T   | C   | T   |
| 1639 | ACG | TAC | CAT | GGC | AAT | ATC | GAT | AAG | CCC | GCA | GTC | ACC | TGT | ACG |
|      | TGC | ATG | GTA | CCG | TTA | TAG | CTA | TTC | GGG | CGT | CAG | TGG | ACA | TGC |
|      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| +1   | P   | N   | P   | Q   | R   | N   | D   | S   | V   | P   | T   | L   | A   | Q   |
| 1681 | CCA | AAT | CCG | CAA | CGT | AAT | GAC | AGT | GTA | CCA | ACC | CTG | GCG | CAG |
|      | GGT | TTA | GGC | GTT | GCA | TTA | CTG | TCA | CAT | GGT | TGG | GAC | CGC | GTC |
|      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| +1   | M   | T   | D   | K   | A   | I   | E   | L   | L   | S   | K   | N   | E   | K   |
| 1723 | ATG | ACC | GAC | AAA | GCC | ATT | GAA | TTG | TTG | AGT | AAA | AAT | GAG | AAA |
|      | TAC | TGG | CTG | TTT | CGG | TAA | CTT | AAC | AAC | TCA | TTT | TTA | CTC | TTT |
|      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| +1   | G   | F   | F   | L   | Q   | V   | E   | G   | A   | S   | I   | D   | K   | Q   |
| 1765 | GGC | TTT | TTC | CTG | CAA | GTT | GAA | GGT | GCG | TCA | ATC | GAT | AAA | CAG |
|      | CCG | AAA | AAG | GAC | GTT | CAA | CTT | CCA | CGC | AGT | TAG | CTA | TTT | GTC |
|      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| +1   | D   | H   | A   | A   | N   | P   | C   | G   | Q   | I   | G   | E   | T   | V   |
| 1807 | GAT | CAT | GCT | GCG | AAT | CCT | TGT | GGG | CAA | ATT | GGC | GAG | ACG | GTC |
|      | CTA | GTA | CGA | CGC | TTA | GGA | ACA | CCC | GTT | TAA | CCG | CTC | TGC | CAG |
|      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| +1   | D   | L   | D   | E   | A   | V   | Q   | R   | A   | L   | E   | F   | A   | K   |
| 1849 | GAT | CTC | GAT | GAA | GCC | GTA | CAA | CGG | GCG | CTG | GAA | TTC | GCT | AAA |
|      | CTA | GAG | CTA | CTT | CGG | CAT | GTT | GCC | CGC | GAC | CTT | AAG | CGA | TTT |
|      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| +1   | K   | E   | G   | N   | T   | L   | V   | I   | V   | T   | A   | D   | H   | A   |
| 1891 | AAG | GAG | GGT | AAC | ACG | CTG | GTC | ATA | GTC | ACC | GCT | GAT | CAC | GCC |
|      | TTC | CTC | CCA | TTG | TGC | GAC | CAG | TAT | CAG | TGG | CGA | CTA | GTG | CGG |
|      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| +1   | H   | A   | S   | Q   | I   | V   | A   | P   | D   | T   | K   | A   | P   | G   |
| 1933 | CAC | GCC | AGC | CAG | ATT | GTT | GCG | CCG | GAT | ACC | AAA | GCT | CCG | GGC |
|      | GTG | CGG | TCG | GTC | TAA | CAA | CGC | GGC | CTA | TGG | TTT | CGA | GGC | CCG |
|      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| +1   | L   | T   | Q   | A   | L   | N   | T   | K   | D   | G   | A   | V   | M   | V   |
| 1975 | CTC | ACC | CAG | GCG | CTA | AAT | ACC | AAA | GAT | GGC | GCA | GTG | ATG | GTG |
|      | GAG | TGG | GTC | CGC | GAT | TTA | TGG | TTT | CTA | CCG | CGT | CAC | TAC | CAC |

**FIG. 29-4**

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|      |     |     |     |     |     |     |     |     |     |         |     |     |     |     |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|---------|-----|-----|-----|-----|
| +1   | M   | S   | Y   | G   | N   | S   | E   | E   | D   | S       | Q   | E   | H   | T   |
| 2017 | ATG | AGT | TAC | GGG | AAC | TCC | GAA | GAG | GAT | TCA     | CAA | GAA | CAT | ACC |
|      | TAC | TCA | ATG | CCC | TTG | AGG | CTT | CTC | CTA | AGT     | GTT | CTT | GTA | TGG |
|      |     |     |     |     |     |     |     |     |     |         |     |     |     |     |
| +1   | G   | S   | Q   | L   | R   | I   | A   | A   | Y   | G       | P   | H   | A   | A   |
| 2059 | GGC | AGT | CAG | TTG | CGT | ATT | GCG | GCG | TAT | GGC     | CCG | CAT | GCC | GCC |
|      | CCG | TCA | GTC | AAC | GCA | TAA | CGC | CGC | ATA | CCG     | GGC | GTA | CGG | CGG |
|      |     |     |     |     |     |     |     |     |     |         |     |     |     |     |
| +1   | N   | V   | V   | G   | L   | T   | D   | Q   | T   | D       | L   | F   | Y   | T   |
| 2101 | AAT | GTT | GTT | GGA | CTG | ACC | GAC | CAG | ACC | GAT     | CTC | TTC | TAC | ACC |
|      | TTA | CAA | CAA | CCT | GAC | TGG | CTG | GTC | TGG | CTA     | GAG | AAG | ATG | TGG |
|      |     |     |     |     |     |     |     |     |     |         |     |     |     |     |
| +1   | M   | K   | A   | A   | L   | G   | D   | I   | A   | His tag |     |     |     |     |
| 2143 | ATG | AAA | GCC | GCT | CTG | GGG | GAT | ATC | GCA | H       | H   | H   | H   | H   |
|      | TAC | TTT | CGG | CGA | GAC | CCC | CTA | TAG | CGT | CAC     | CAT | CAC | CAT | CAC |
|      |     |     |     |     |     |     |     |     |     | GTG     | GTA | GTG | GTA | GTG |
|      |     |     |     |     |     |     |     |     |     |         |     |     |     |     |
| +1   | H   | *   |     |     |     |     |     |     |     |         |     |     |     |     |
| 2185 | CAT | TAA |     |     |     |     |     |     |     |         |     |     |     |     |
|      | GTA | ATT |     |     |     |     |     |     |     |         |     |     |     |     |

**FIG. 29-5**



### FIG. 30-2

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| Spacer |     | His-tag |     |     |     |     |     |     |
|--------|-----|---------|-----|-----|-----|-----|-----|-----|
| +1     | G   | H       | H   | H   | H   | H   | H   | *   |
| 946    | GGT | CAC     | CAT | CAC | CAT | CAC | CAT | TAA |
|        | CCA | GTG     | GTA | GTG | GTA | GTG | GTA | ATT |

**FIG. 30-3**

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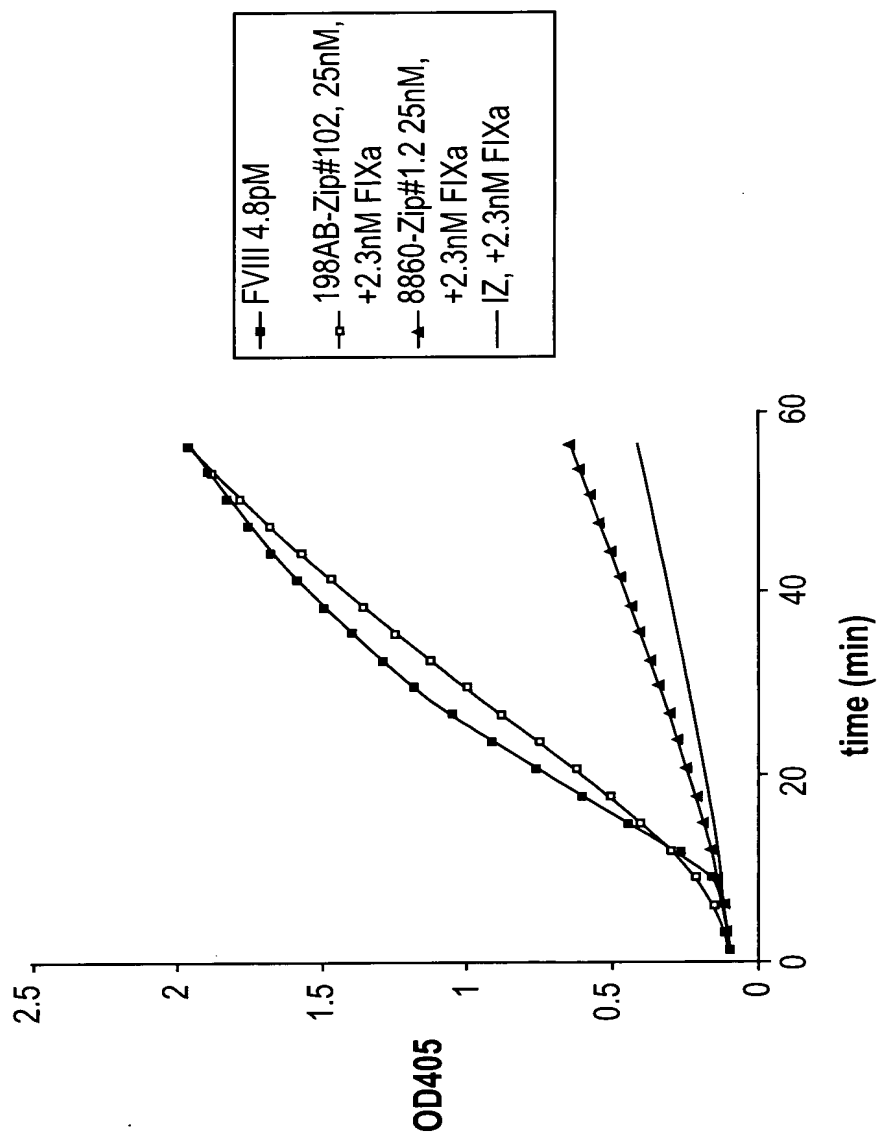


FIG. 31



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HindIII

2206 CAG GAA ACA GCT ATG ACC ATG ATT ACG CC $\tilde{A}$  $\tilde{\sim}$  $\tilde{A}$  $\tilde{G}$  $\tilde{C}$  $\tilde{\sim}$  $\tilde{T}$  $\tilde{T}$ C CAT GAA AAT  
 GTC CTT TGT CGA TAC TGG TAC TAA TGC GGT TCG AAG GTA CTT TTA

PelB-Leader

M K Y L L P T

2251 TCT ATT TCA AGG AGA CAG TCA TAA TGA AAT ACC TAT TGC CTA CGG  
 AGA TAA AGT TCC TCT GTC AGT ATT ACT TTA TGG ATA ACG GAT GCC

SfiI

2296 CAG CCG CTG GAT TGT TAT TAC TCG C $\tilde{G}$  $\tilde{\sim}$  $\tilde{C}$  $\tilde{\sim}$  $\tilde{C}$  $\tilde{\sim}$  $\tilde{A}$  $\tilde{G}$  $\tilde{C}$  $\tilde{\sim}$  $\tilde{C}$  $\tilde{A}$  TGG CCC  
 GTC GGC GAC CTA ACA ATA ATG AGC GCC GGG TCG GCC GGT ACC GGG

Polylinker

Q V Q L Q A R L Q V D L E I K

AscI

2341 AGG TGC AGC TGC A $\tilde{G}$  $\tilde{\sim}$  $\tilde{G}$  $\tilde{\sim}$  $\tilde{C}$  $\tilde{\sim}$  $\tilde{G}$  $\tilde{C}$  $\tilde{\sim}$  TGC AGG TCG ACC TCG AGA TCA AAC  
 TCC ACG TCG ACG TCC GCG CGG ACG TCC AGC TGG AGC TCT AGT TTG

Spacer Myc-tag

R A A A E Q K L I S E E D L N

NotI

2386 GGG C $\tilde{G}$  $\tilde{\sim}$  $\tilde{G}$  $\tilde{\sim}$  $\tilde{C}$  $\tilde{\sim}$  $\tilde{C}$  $\tilde{\sim}$  $\tilde{A}$  $\tilde{G}$  AAC AAA AAC TCA TCT CAG AAG AGG ATC TGA ATG  
 CCC GCC GGC GTC TTG TTT TTG AGT AGA GTC TTC TCC TAG ACT TAC

Spacer His tag

G A A H H H H H \* \*

EcoRI

2431 GGG C $\tilde{G}$  $\tilde{\sim}$  $\tilde{G}$  $\tilde{\sim}$  $\tilde{C}$  $\tilde{\sim}$  $\tilde{C}$  $\tilde{\sim}$  $\tilde{A}$  $\tilde{G}$  ATC ACC ATC ACC ATC ACT AAT AAG A $\tilde{A}$  $\tilde{\sim}$  $\tilde{T}$  $\tilde{\sim}$  $\tilde{T}$  $\tilde{\sim}$  $\tilde{C}$  $\tilde{\sim}$  CTG GCC  
 CCC GCC GTG TAG TGG TAG TGG TAG TGA TTA TTC TTA AGT GAC CGG

**FIG. 33**



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|             |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| PelB-leader |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| +1          | M   | K   | Y   | L   | L   | P   | T   | A   | A   | A   | G   | L   | L   | L   | L   |
| 1           | ATG | AAA | TAC | CTA | TTG | CCT | ACG | GCA | GCC | GCT | GGA | TTG | TTA | TTA | CTC |
|             | TAC | TTT | ATG | GAT | AAC | GGA | TGC | CGT | CGG | CGA | CCT | AAC | AAT | AAT | GAG |
| VH          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| +1          | A   | A   | Q   | P   | A   | M   | A   | E   | V   | K   | L   | V   | E   | S   | G   |
| 46          | GCG | GCC | CAG | CCG | GCC | ATG | GCC | GAG | GTG | AAG | CTG | GTG | GAG | TCT | GGG |
|             | CGC | CGG | GTC | GGC | CGG | TAC | CGG | CTC | CAC | TTC | GAC | CAC | CTC | AGA | CCC |
| +1          | G   | G   | L   | V   | K   | P   | G   | G   | S   | L   | K   | L   | S   | C   | A   |
| 91          | GGA | GGC | TTA | GTG | AAG | CCT | GGA | GGG | TCC | CTG | AAA | CTC | TCC | TGT | GCA |
|             | CCT | CCG | AAT | CAC | TTC | GGA | CCT | CCC | AGG | GAC | TTT | GAG | AGG | ACA | CGT |
| +1          | A   | S   | G   | F   | T   | F   | S   | S   | Y   | T   | M   | S   | W   | V   | R   |
| 136         | GCC | TCT | GGA | TTC | ACT | TTC | AGT | AGC | TAT | ACC | ATG | TCT | TGG | GTT | CGC |
|             | CGG | AGA | CCT | AAG | TGA | AAG | TCA | TCG | ATA | TGG | TAC | AGA | ACC | CAA | GCG |
| +1          | Q   | T   | P   | E   | K   | R   | L   | E   | W   | V   | A   | T   | I   | S   | S   |
| 181         | CAG | ACT | CCG | GAG | AAG | AGG | CTG | GAG | TGG | GTC | GCA | ACC | ATT | AGT | AGT |
|             | GTC | TGA | GGC | CTC | TTC | TCC | GAC | CTC | ACC | CAG | CGT | TGG | TAA | TCA | TCA |
| +1          | G   | G   | S   | S   | T   | Y   | Y   | P   | D   | S   | V   | K   | G   | R   | F   |
| 226         | GGN | GGT | AGT | TCC | ACC | TAC | TAT | CCA | GAC | AGT | GTG | AAG | GGC | CGA | TTC |
|             | CCN | CCA | TCA | AGG | TGG | ATG | ATA | GGT | CTG | TCA | CAC | TTC | CCG | GCT | AAG |
| +1          | T   | I   | S   | R   | D   | N   | A   | K   | N   | T   | L   | Y   | L   | Q   | M   |
| 271         | ACC | ATC | TCC | AGA | GAC | AAT | GCC | AAG | AAC | ACC | CTG | TAC | CTG | CAA | ATG |
|             | TGG | TAG | AGG | TCT | CTG | TTA | CGG | TTC | TTG | TGG | GAC | ATG | GAC | GTT | TAC |
| +1          | S   | S   | L   | R   | S   | E   | D   | T   | A   | M   | Y   | Y   | C   | T   | R   |
| 316         | AGC | AGT | CTG | AGG | TCT | GAG | GAC | ACA | GCC | ATG | TAT | TAC | TGT | ACA | AGA |
|             | TCG | TCA | GAC | TCC | AGA | CTC | CTG | TGT | CGG | TAC | ATA | ATG | ACA | TGT | TCT |
| +1          | E   | G   | G   | G   | F   | T   | V   | N   | W   | Y   | F   | D   | V   | W   | G   |
| 361         | GAG | GGG | GGT | GGT | TTC | ACC | GTC | AAC | TGG | TAC | TTC | GAT | GTC | TGG | GGC |
|             | CTC | CCC | CCA | CCA | AAG | TGG | CAG | TTG | ACC | ATG | AAG | CTA | CAG | ACC | CCG |
| Leader      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| +1          | A   | G   | T   | S   | V   | T   | V   | S   | S   | G   | G   | G   | G   | S   | G   |
| 406         | GCA | GGA | ACC | TCA | GTC | ACC | GTC | TCC | TCA | GGT | GGA | GGC | GGT | TCA | GGT |
|             | CGT | CCT | TGG | AGT | CAG | TGG | CAG | AGG | AGT | CCA | CCT | CCG | CCA | AGT | CCA |

FIG. 34-1

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|     |     |        |     |     |     |         |     |     |     |     |     |     |     |     |     |
|-----|-----|--------|-----|-----|-----|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|     |     |        |     |     |     |         |     |     |     | VK  |     |     |     |     |     |
| +1  | G   | R      | A   | S   | G   | G       | G   | G   | S   | D   | I   | V   | L   | T   | Q   |
| 451 | GGG | CGC    | GCC | TCT | GGC | GGT     | GGC | GGA | TCG | GAC | ATT | GTG | CTG | ACA | CAG |
|     | CCC | GCG    | CGG | AGA | CCG | CCA     | CCG | CCT | AGC | CTG | TAA | CAC | GAC | TGT | GTC |
| +1  | S   | P      | A   | S   | L   | A       | V   | S   | L   | G   | Q   | R   | A   | T   | I   |
| 496 | TCT | CCA    | GCT | TCT | TTG | GCT     | GTG | TCT | CTA | GGG | CAG | AGG | GCC | ACC | ATA |
|     | AGA | GGT    | CGA | AGA | AAC | CGA     | CAC | AGA | GAT | CCC | GTC | TCC | CGG | TGG | TAT |
| +1  | S   | C      | R   | A   | S   | E       | S   | V   | D   | S   | Y   | G   | Y   | N   | F   |
| 541 | TCC | TGC    | AGA | GCC | AGT | GAA     | AGT | GTT | GAT | AGT | TAT | GGC | TAT | AAT | TTT |
|     | AGG | ACG    | TCT | CGG | TCA | CTT     | TCA | CAA | CTA | TCA | ATA | CCG | ATA | TTA | AAA |
| +1  | M   | H      | W   | Y   | Q   | Q       | I   | P   | G   | Q   | P   | P   | K   | L   | L   |
| 586 | ATG | CAC    | TGG | TAT | CAG | CAG     | ATA | CCA | GGA | CAG | CCA | CCC | AAA | CTC | CTC |
|     | TAC | GTG    | ACC | ATA | GTC | GTC     | TAT | GGT | CCT | GTC | GGT | GGG | TTT | GAG | GAG |
| +1  | I   | Y      | R   | A   | S   | N       | L   | E   | S   | G   | I   | P   | A   | R   | F   |
| 631 | ATC | TAT    | CGT | GCA | TCC | AAC     | CTA | GAG | TCT | GGG | ATC | CCT | GCC | AGG | TTC |
|     | TAG | ATA    | GCA | CGT | AGG | TTG     | GAT | CTC | AGA | CCC | TAG | GGA | CGG | TCC | AAG |
| +1  | S   | G      | S   | G   | S   | R       | T   | D   | F   | T   | L   | T   | I   | N   | P   |
| 676 | AGT | GGC    | AGT | GGG | TCT | AGG     | ACA | GAC | TTC | ACC | CTC | ACC | ATT | AAT | CCT |
|     | TCA | CCG    | TCA | CCC | AGA | TCC     | TGT | CTG | AAG | TGG | GAG | TGG | TAA | TTA | GGA |
| +1  | V   | E      | A   | D   | D   | V       | A   | T   | Y   | Y   | C   | Q   | Q   | S   | N   |
| 721 | GTG | GAG    | GCT | GAT | GAT | GTT     | GCA | ACC | TAT | TAC | TGT | CAG | CAA | AGT | AAT |
|     | CAC | CTC    | CGA | CTA | CTA | CAA     | CGT | TGG | ATA | ATG | ACA | GTC | GTT | TCA | TTA |
| +1  | E   | D      | P   | L   | T   | F       | G   | T   | G   | T   | R   | L   | E   | I   | K   |
| 766 | GAG | GAT    | CCG | CTC | ACG | TTC     | GGT | ACT | GGG | ACC | AGA | CTG | GAA | ATA | AAA |
|     | CTC | CTA    | GGC | GAG | TGC | AAG     | CCA | TGA | CCC | TGG | TCT | GAC | CTT | TAT | TTT |
|     |     | Spacer |     |     |     | Myc-tag |     |     |     |     |     |     |     |     |     |
| +1  | R   | A      | A   | A   | E   | Q       | K   | L   | I   | S   | E   | E   | D   | L   | N   |
| 811 | CGG | GCG    | GCC | GCA | GAA | CAA     | AAA | CTC | ATC | TCA | GAA | GAG | GAT | CTG | AAT |
|     | GCC | CGC    | CGG | CGT | CTT | GTT     | TTT | GAG | TAG | AGT | CTT | CTC | CTA | GAC | TTA |
|     |     | Spacer |     |     |     | His tag |     |     |     |     |     |     |     |     |     |
| +1  | G   | A      | A   | H   | H   | H       | H   | H   | H   | *   | *   |     |     |     |     |
| 856 | GGG | GCG    | GCA | CAT | CAC | CAT     | CAC | CAT | CAC | TAA | TAA |     |     |     |     |
|     | CCC | CGC    | CGT | GTA | GTG | GTA     | GTG | GTA | GTG | ATT | ATT |     |     |     |     |

**FIG. 34-2**

VL

**FIG. 35-1**

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+1 S L A V S L G Q R A T I S C R  
 496 TCC TTA GCT GTA TCT CTG GGG CAG AGG GCC ACC ATC TCA TGC AGG  
 AGG AAT CGA CAT AGA GAC CCC GTC TCC CGG TGG TAG AGT ACG TCC

+1 A S K S V S T S G Y S Y M H W  
 541 GCC AGC AAA AGT GTC AGT ACA TCT GGC TAT AGT TAT ATG CAC TGG  
 CGG TCG TTT TCA CAG TCA TGT AGA CCG ATA TCA ATA TAC GTG ACC

+1 Y Q Q K P G Q P P K L L I Y L  
 586 TAC CAA CAG AAA CCA GGA CAG CCA CCC AAA CTC CTC ATC TAT CTT  
 ATG GTT GTC TTT GGT CCT GTC GGT GGG TTT GAG GAG TAG ATA GAA

+1 A S N L E S G V P A R F S G S  
 631 GCA TCC AAC CTA GAA TCT GGG GTC CCT GCC AGG TTC AGT GGC AGT  
 CGT AGG TTG GAT CTT AGA CCC CAG GGA CGG TCC AAG TCA CCG TCA

+1 G S G T D F T L N I H P V E E  
 676 GGG TCT GGG ACA GAC TTC ACC CTC AAC ATC CAT CCT GTG GAG GAG  
 CCC AGA CCC TGT CTG AAG TGG GAG TTG TAG GTA GGA CAC CTC CTC

+1 E D A A T Y Y C Q H S R E L P  
 721 GAG GAT GCT GCA ACC TAT TAC TGT CAG CAC AGT AGG GAG CTT CCT  
 CTC CTA CGA CGT TGG ATA ATG ACA GTC GTG TCA TCC CTC GAA GGA

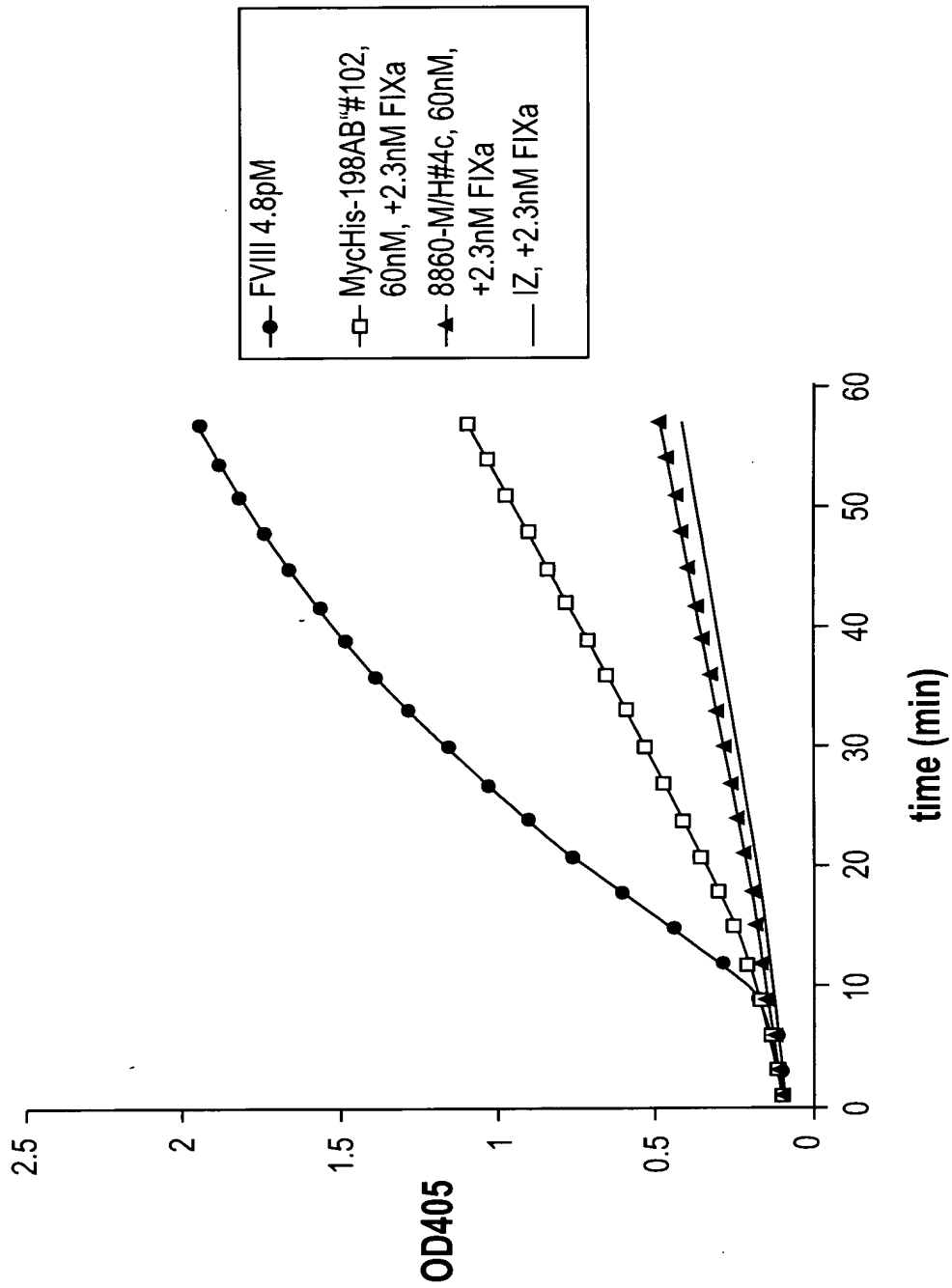
|     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |  |         |
|-----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|---------|
|     | +1 | R   | T   | F   | G   | G   | G   | T   | K   | L   | E   | I   | K   | R   |  | Spacer  |
| 766 |    | CGG | ACG | TTC | GGT | GGA | GGC | ACC | AAG | CTG | GAA | ATC | AAA | CGG |  | A A     |
|     |    | GCC | TGC | AAG | CCA | CCT | CCG | TGG | TTC | GAC | CTT | TAG | TTT | GCC |  | GGG GCC |
|     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |  | CGC CGG |

|     |    |     |  |         |     |     |     |     |     |     |     |     |     |     |     |        |         |
|-----|----|-----|--|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--------|---------|
|     | +1 | A   |  | Myc-tag |     |     |     |     |     |     |     |     |     |     |     | Spacer |         |
| 811 |    | GCA |  | E       | Q   | K   | L   | I   | S   | E   | E   | D   | L   | N   | G   |        | A A     |
|     |    | CGT |  | GAA     | CAA | AAA | CTC | ATC | TCA | GAA | GAG | GAT | CTG | AAT | GGG |        | GCG GCA |
|     |    |     |  | CTT     | GTT | TTT | GAG | TAG | AGT | CTT | CTC | CTA | GAC | TTA | CCC |        | CGC CGT |

His tag  
 +1 H H H H H H \*  
 856 CAT CAC CAT CAC CAT CAC TAA  
 GTA GTG GTA GTG GTA GTG ATT

**FIG. 35-2**

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**FIG. 36**